Unit 1: Materials Management

TABLE OF CONTENTS

Unit 1: Materials Management

Unit Summary

Improving your schools "materials management" practices requires rethinking what we consider to be "waste". It means understanding where the products we use come from, what it means to throw something away, and how we can divert waste from the landfill to recover resources and make them into new products. It also means inspiring creativity around how to make less waste in the first place. Both the earth's resources and landfill space are limited – good materials management practices can keep valuable resources out of the landfill. Before you dive into the dumpsters, review this summary to help guide your investigation:

Actions *Here are some actions students will take to complete the green@school checklist and reduce their school's environmental impact.*	1. Become campus materials management detectives—check out your classrooms, bathrooms, offices, and cafeteria and interview staff from your school and district to find out what types of materials are purchased, what policies are in place, and what practices are the norm for making purchases. 2. Investigate existing waste reduction and diversion practices at your school (like recycling, composting, or donation) and propose improvements. 3. Improve existing or implement new materials management practices at your school and/or recommend actions to the district.
Campaign Opportunities *There are lots of ways to involve teachers and classmates in understanding the impacts of the materials they use. Ask your green@school coordinators for suggestions and guidance!*	1. Conduct a "Materials Management" campaign, educating your teachers and peers on how to properly sort materials based on your school's waste services. 2. Host a zero-waste event, where all waste is diverted from the landfill and through composting and recycling. 3. Design a Reuse Campaign that encourages your teachers and peers to swap one-time use items for reusable options. 4. Build a garden and/or compost area on your campus to help divert food waste from the landfill.
Skills *Each team will build & apply different skills to accomplish their green@school goals. Here are some specific skill sets students may exercise across this program.*	1. Calculate the rate materials are being diverted from the landfill. Calculate the potential diversion rate with proper sorting. 2. Design effective messaging for your peers and teachers about materials management and advocate for alternative practices at your school. 3. Research alternative product choices and interview staff responsible for purchasing for your school to identify possible product changes. 4. Identify compostable, recyclable, and landfill material types.
Contacts *Here the people you may want to help them contact.*	Purchasing Manager, Your School District Grounds-Custodial Manager, Your School District **Who else? Write any other contacts you can think of:**

Unit 1: Materials Management

Certification Checklist

As described in the green@school Handbook, each Unit corresponds with a targeted resource conservation goal and a specific section of the California Green Business Program's checklist, designed so that students will use this tool (the checklist) to assess their current campus environmental actions and identify opportunities for improvement (learn more at http://www.greenbusinessca.org/). This will occur following their deep dive into the subject through the lessons and activities shared in this chapter that seek to build their baseline knowledge on the subject before they are asked to become subject matter experts assessing their school's operations and practices. The checklist is included at the beginning of each unit so you can see what you're building towards, but again, know that its expected use will follow the activities and lessons shared below. Further, completing the actions in this checklist will enable your school to receive statewide recognition for your environmental leadership (bonus!). To assess the materials management practices on your campus, walk through this list with your students, administrators, or other resource-relevant school site staff.

green@school Certification Checklist						
#	Measure/Action/Practice	Does your school meet this measure?			Controlled by school staff administrator (SA), school district (D) or Students (ST)	Investigation Notes and Status
		YES	NO	DON'T KNOW		
Materials Management						
Purchase with Recycled Content						
Required						
1	Purchase paper towels with 35% post-consumer waste					

Unit 1: Materials Management

green@school Certification Checklist

#	Measure/Action/Practice	Does your school meet this measure?			Controlled by school staff administrator (SA), school district (D) or Students (ST)	Investigation Notes and Status
		YES	NO	DON'T KNOW		
Materials Management						
2	Purchase copier/printer paper with at least 30% post-consumer waste					
3	Purchase office/copier paper with 100% post-consumer waste					
4	Purchase or obtain previously used furniture, supplies or materials					
5	Purchase letterhead with the highest recycled content available					
6	Purchase envelopes with the highest recycled content available					
7	Purchase toilet seat covers and toilet paper with recycled content					
8	Remodel/build with materials containing recycled content					
9	Purchase tissues with the highest recycled content available					

Unit 1: Materials Management

green@school Certification Checklist

#	Measure/Action/Practice	Does your school meet this measure?			Controlled by school staff administrator (SA), school district (D) or Students (ST)	Investigation Notes and Status
		YES	NO	DON'T KNOW		
Materials Management						
10	Purchase garbage bags with the highest recycled content available					
11	Purchase folders or other paper products with the highest recycled content available					
12	Purchase business cards with recycled content					
13	Purchase carpet, carpet undercushion, or flooring with recycled content					
14	Use refilled or remanufactured laser and copier toner cartridges					
15	Purchase storage bins and recycling containers with recycled content					

Unit 1: Materials Management

green@school Certification Checklist

#	Measure/Action/Practice	Does your school meet this measure? YES	NO	DON'T KNOW	Controlled by school staff administrator (SA), school district (D) or Students (ST)	Investigation Notes and Status
Materials Management						
Recycle Materials						
Required						
1	Recycle all paper, glass, metal, cardboard and plastics accepted in your area					
2	Provide recycling containers at convenient and appropriate locations (i.e. lobbies, guest rooms, vending machines, kitchens, next to garbage containers, desks, etc.)					
Complete at least 1:						
3	Recycle CDs/DVDs					
4	Compost food waste					
5	Recycle or reuse carpeting					
6	Recycle scrap metal					

Unit 1: Materials Management

green@school Certification Checklist

#	Measure/Action/Practice	Does your school meet this measure? YES	NO	DON'T KNOW	Controlled by school staff administrator (SA), school district (D) or Students (ST)	Investigation Notes and Status
Materials Management						
7	Recycle wood including pallets					
8	Compost landscape trimmings (green waste) and debris					
Reduce Waste						
Required						
1	Eliminate the use of polystyrene, such as Styrofoam, in beverages and food service ware					
Complete at least 6:						
2	Buy products in returnable or reusable containers					
3	Practice efficient copying by using the size reduction feature (print two pages of a document on one page, set word processing defaults for smaller fonts and narrow margins)					

Unit 1: Materials Management

green@school Certification Checklist

#	Measure/Action/Practice	Does your school meet this measure?			Controlled by school staff administrator (SA), school district (D) or Students (ST)	Investigation Notes and Status
		YES	NO	DON'T KNOW		
Materials Management						
4	Subscribe to journals, trade magazines, etc. online rather than receiving hard copies					
5	Reduce printing of emails, attachments and documents					
6	Work with vendors to: minimize and take back packaging (including empty containers), eliminate polystyrene (Styrofoam, bubble wrap, etc.) or take back used/damaged products for reuse or recycling; to minimize packaging					
7	Use electronic billing methods to invoice customers and receive payment					
8	Eliminate paper documents by using electronic forms and contracts					
9	Send and receive faxes directly from computers without printing					

Unit 1: Materials Management

green@school Certification Checklist

#	Measure/Action/Practice	Does your school meet this measure? YES	NO	DON'T KNOW	Controlled by school staff administrator (SA), school district (D) or Students (ST)	Investigation Notes and Status
Materials Management						
10	Centralize meeting announcements and journals in a single location (bulletin board, white board, email, etc.) to reduce printed copies					
11	Lease, rather than purchase computers and printers or upgrade desktop computers instead of purchasing new ones					
12	Leave mowed grass on lawn (grasscycling)					
Reuse Materials						
Complete at least 3:						
1	Reuse garbage bag liners					
2	Reuse paper or plastic packaging materials in your own shipments					
3	Reuse envelopes					

Unit 1: Materials Management

green@school Certification Checklist

#	Measure/Action/Practice	Does your school meet this measure? YES	NO	DON'T KNOW	Controlled by school staff administrator (SA), school district (D) or Students (ST)	Investigation Notes and Status
Materials Management						
4	Have your toner cartridges refilled for reuse					
5	Donate furniture, supplies, scrap materials, etc. or use a waste exchange program where another business can take your unwanted items					
6	Print on the back side of previously printed on paper. Either use a second tray of the printer for such paper or keep it stacked next to the printer for hand loading.					
Reduce						
Recommended (Take your school above and beyond!)						
1	Eliminate individual bottles of water for employees and students					
2	Default settings: If copiers and printers have duplex printing capability, duplex printing must be enabled. New machines must have duplex printing capability					

Unit 1: Materials Management

green@school Certification Checklist

#	Measure/Action/Practice	Does your school meet this measure? YES	NO	DON'T KNOW	Controlled by school staff administrator (SA), school district (D) or Students (ST)	Investigation Notes and Status
	Materials Management					
3	Reduce all unwanted mailings: • Eliminate duplicates by returning labels & requesting all but one be removed • Reduce junk mail. Guidance and a PDF kit are at http://stopjunkmail.org Reduce catalogs at www.catalogchoice.org • Eliminate duplicates in your own mailing lists					
4	Design marketing materials that require no envelope-simply fold and mail					
5	Opt-out of unnecessary publications including Yellow Pages, etc. http://yellowpagesoptout.com/					
6	Serve food at all events in reusable dishes					
7	Conduct routine (informal) waste audits. Look in your garbage dumpster annually to see if there are items that could instead by reused or recycled					

Unit 1: Materials Management

Student Learning Outcomes

In this unit, students will become proficient in the vocabulary and concepts describing materials management. The following outcomes will be achieved through activities, demonstrations, analysis, and investigation. Upon completing this unit, students will:

1. Understand the concepts of materials management, resource recovery, and waste diversion, how landfill waste contributes to climate change, and how waste infrastructure impacts diversion rates.
2. Observe peer and staff sorting habits and material use at school to develop an effective waste diversion campaign.
3. Identify opportunities for purchasing products with recycled content and for reducing waste.
4. Advise peers and staff on good sorting habits that include composting, recycling, and other ways to divert materials from landfill.
5. Share materials management practices with their family and community.

Lesson Plan

The Materials Management unit will challenge students to think differently about all of the "stuff" we use, reuse, and then get rid of via recycling, composting, and landfilling. Students will investigate how their school manages materials from purchasing supplies to disposal to recovering resources through waste diversion. The activities in this unit will enhance knowledge of different material types, enabling students to correctly sort recyclable, compostable, and landfill materials. Students will also engage their peers in improving their school's materials management strategy by designing new bin labels, educating fellow students and staff about how to reduce their landfill contribution, and proposing new purchasing policies to their administration.

LESSON 1: WHERE IS "AWAY"?

LESSON 2: WHAT GOES WHERE? HOW TO SORT WASTE

LESSON 3: ZERO WASTE SCHOOL

LESSON 4: PURCHASING ENVIRONMENTALLY PREFERABLE PRODUCTS

LESSON 5: HOW TO TAKE INITIATIVE AND INFLUENCE YOUR PEERS, STAFF, AND COMMUNITY

A note to instructors: the plug-and-play activities shared throughout all green@school units are framed for your students, with the hope that you can simply offer/print these activities for their direct use. No extra prep time required!

Unit 1: Materials Management

Lesson 1: Where is "Away"?

Every day we use and throw away lots of different materials, from the crumbs left over from breakfast to the plastic a new notebook was wrapped inside. But how do these everyday activities affect the environment? The truth is every item we buy or throw away has an impact. In 2011, Americans generated 250 million tons of materials, 87 million tons of which was recycled or composted. This evens out to about 4.4 pounds of landfill trash and 1.53 pounds of materials that were recycled or composted per person per day! Much of this landfill waste is made up of organic waste, which decomposes in the landfill and releases methane, a greenhouse gas *(a gas that traps heat in the atmosphere and warms our planet)*. But it's not only the methane emissions released from landfills that contribute to climate change and negatively impact the environment. The energy used to produce, process, transport, and dispose of the food we eat and the goods we use made up about 42% of the US greenhouse gas emissions in 2009. For example, take a look at Scenario 1 in the following figure and think about this sheet of paper and the materials needed to harvest the trees, transport the logs, manufacture the paper, and dispose of and transport it to the landfill once you're done with it. How are the impacts of this paper different in Scenario 2?

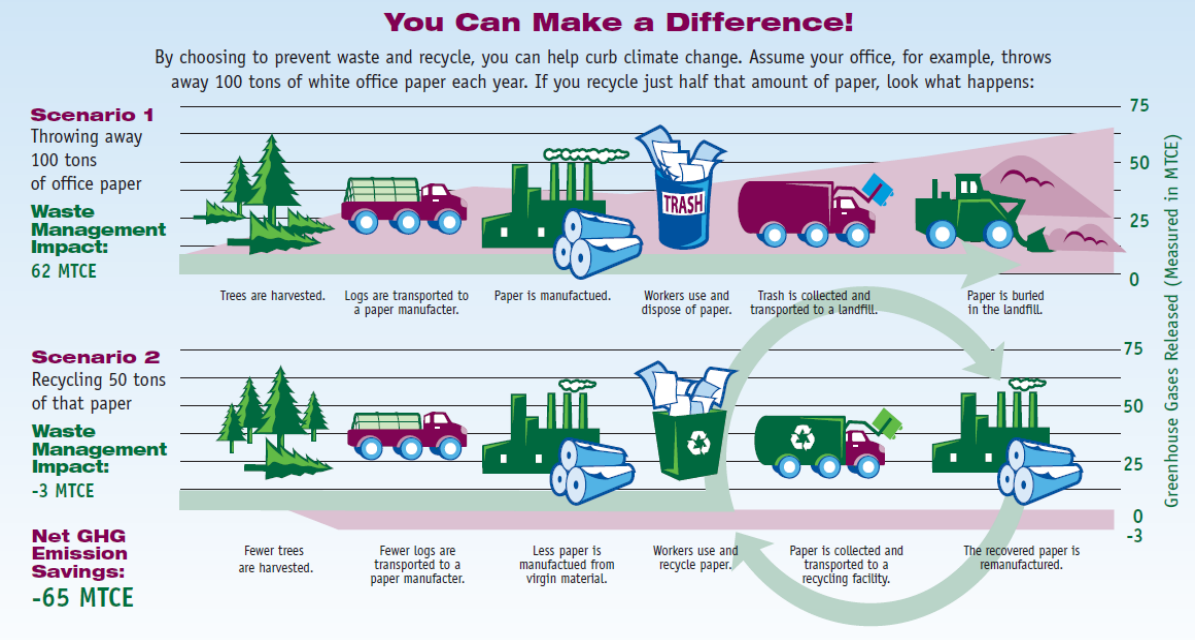

Figure 1 image source

How can the green@school team reduce the impact of all that your school buys, uses, and throws away? Recycling, composting, reusing, reducing waste at the source can reduce emissions from producing goods and reduce methane emissions from landfills. Additionally, good disposal practices can prevent litter from polluting our water bodies. Take another look at Scenario 2 above and think how your impact can change by using recycled paper instead of new paper, or by recycling a used piece of paper instead of throwing it away, or even by reducing the amount of paper your school uses by printing only what is necessary.

Unit 1: Materials Management

➢ Action Activity | *Fly Swatter Challenge*

The *fly swatter challenge* is designed to teach students vocabulary on a particular topic using friendly competition to engage them. This exercise aims to build student knowledge of basic materials management concepts and terminology. First write all terms shown below (e.g., compost, landfill) on a white board and circle them. Ideally, students should have access to a few tablets or computers to look up words, or be given the definitions prior to the game. Have students divide into two teams and line up, then choose one student for each team to start off the game. Read a definition aloud and have students race to swat the correct term on the board. If you do not have a fly swatter, students can point. The first student to slap the correct word earns a point for their team. That student goes to the back of the line and the next student will come to the board. Refine the rules as you see fit for your class, such as repeating the definition only once per round, or allowing teammates to help the student at the board if they do not know a definition. Students will have fun with this fast-paced game while familiarizing themselves with the following terms:

Materials Management Key Terms (feel free to add your own additional terms):

- **Compost**: A mixture of decaying organic *(derived from living things)* matter; often used as a fertilizer for soil.[1]
- **Diversion**: Sending waste to an ultimate destination other than a landfill, either through recycling, composting, donating, or reusing a discarded item.
- **Landfill:** Engineered areas where waste is stored permanently. Landfills usually have liner systems and other safeguards to prevent polluting the groundwater.[2]
- **Materials Recovery Facility (MRF):** Pronounced "merf", these facilities take in residential and commercial waste streams, and separate materials into saleable units for selling and reprocessing.
- **Municipal Solid Waste:** Standard waste, such as paper, cans, bottles, and food scraps that is generated by residents, businesses, and institutions.[3]
- **Post-Consumer Waste:** The trash produced when someone has used and disposed of an item (e.g., your newspaper that you put in your recycling bin after reading). If you buy an item that says 80% PCW, it means the product is made from 80% post-consumer waste.[3]
- **Precycle:** Pre-planning, before making a purchase, to reduce the waste generated by the purchase of an item, such as buying goods in bulk or recycled goods instead of goods made from new materials.

[1] Green Star Schools, Waste Reduction and Recycling Pathway Classroom Certification Process, accessed on 09/24/14 at http://www.greenstarschools.info/pdf/Waste_Pathway_V6.2_12-10-2012_form10G.pdf.
[2] Municipal Solid Waste, accessed on 09/17/14 at http://www.epa.gov/epawaste/nonhaz/municipal/index.htm
[3] CalRecycle, Waste Prevention Terms and Definitions, accessed on 09/17/14 at https://www.echopaperstore.com/why-use-recycled-paper.php.

Unit 1: Materials Management

- **Recyclable:** A product that is made from a material that can be reused in the creation of another product.
- **Recycling:** Separating and collecting manufactured materials for reprocessing and reuse, either as the same or a new product.
- **Resource Recovery:** Extracting usable resources from the waste stream, such as separating recyclable materials from municipal solid waste to be made into new products.
- **Reuse**: Extending the life of a material or product by repairing or modifying it for additional use, or creating a new use or purpose different from its original use.
- **Upcycle**: Converting a waste product, such as packaging, into a new material or product in a way that increases its quality and economic value. For example, an empty toothpaste tube can be upcycled into a coin purse. Check out TerraCycle.com (http://www.terracycle.com/)!

Unit 1: Materials Management

➢ Reading Activity | *Check Out Important Policies That Encourage Waste Reduction and Waste Diversion at the Local, State and Federal Level*

Local – City of Cupertino example

- City of Cupertino Reusable Bag Ordinance (http://www.cupertino.org/index.aspx?page=1154)
- City of Cupertino Foam Food Ware Container Ordinance (http://www.cupertino.org/index.aspx?page=1208)
- City of Cupertino Green Building Ordinance (http://www.cupertino.org/index.aspx?page=1007)
- City of Cupertino Litter Ordinance

State

- SB 270 Bag Ban (http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140SB270)
- AB 341 Mandatory Commercial Recycling (http://www.calrecycle.ca.gov/recycle/commercial/)
- AB 1826 Commercial Organics (effective 2016) (http:\leginfo.legislature.ca.gov\faces\billNavClient.xhtml?bill_id=201320140AB1826)
- Integrated Waste Management Act- AB 939 (http://www.calrecycle.ca.gov/Laws/Legislation/CalHist/1985to1989.htm)

Federal

- Resource Conservation and Recovery Act (RCRA) (http://www2.epa.gov/laws-regulations/summary-resource-conservation-and-recovery-act)

Policy Analysis: Take a look into at least two of the following policies listed above and ask yourself:

1. How does each policy impact you and your family?
2. Do you think each policy has been/will be successful in diverting waste? Why or why not?
3. What are your city's local policies? Do they meet or exceed state policies?
4. Organizations lobby for policy changes and offer a voice to people in a collective manner. Businesses in materials management (such as waste haulers) are also the main implementers or enforcers of policy change. Check out municipal agency Stopwaste.org (http://stopwaste.org/about/ordinances-and-policies) and waste hauler Recology (http://www.recologymedia.com/press_room/index.php) to learn about how they advocate for policy changes.
5. If you were to lobby for a materials management policy change in your city, what change would you like to see?

Unit 1: Materials Management

Lesson 2: What Goes Where? How to Sort Waste

Do you know which items are recyclable or compostable, and which items are doomed for the landfill? In this lesson you will learn which materials should be placed in which bin, and help students become expert waste sorters. The majority of materials your school disposes of are most likely recyclable or compostable, and setting up an easy-to use system for sorting waste at your school can help make sure those materials do not go to the landfill. In fact, the US EPA estimates that 75% of municipal solid waste is recyclable, but only 30% is actually recycled![4] Additionally, in 2010, over half of the municipal solid waste in the US was made up of compostable goods.[5] Food waste is actually the single most common material sent to the landfill, which decomposes and becomes a source of methane, a greenhouse gas with 25 times the global warming potential of carbon dioxide.[6]

Know that materials accepted for recycling and composting vary by city – cities contract with waste haulers to take away residential and commercial waste and bring it to sorting facilities and landfills. Depending on the capabilities of the facilities in your area, the materials they are able to separate will affect your sorting system, whether you can send food scraps to be composted, and which items you will have to send to landfill instead of diverting. Check your hauler's website for clarification on their service – if you're not sure who your hauler is, check with your city. Check Recology (http://www.recologysouthbay.com/) and this page (http://www.recologysouthbay.com/index.php/for-homes/city-of-cupertino-recycling-garbage-compost) for examples of items you can recycle, compost or landfill locally in Cupertino.

Commonly accepted recyclable items include:

- Plastics: bottles, jugs, food containers, plastic cups and tableware, packaging, film plastics (like clean food wrap or thin plastic packaging). Check with your hauler to see whether plastics must be numbered or if any plastic is allowed.
- Paper and cardboard: cardboard and clean paper of any kind is generally allowed. (Food-soiled paper, tissues, paper towels, and waxed cardboard should be composted, not recycled.)
- Metal: steel cans, aluminum cans, clean aluminum foil. Rusted material is generally not accepted.
- Glass: bottles and jars. Tempered glass and mirror glass are not commonly accepted.

Commonly accepted compostable items include:

- Food and food scraps: municipal composting typically allows any raw or cooked food, including plant-based foods, meat, dairy, bones, bread and pasta, processed foods, etc. If your city does not offer pickup of compostables and your school is interested in

[4]Recycling Stats, accessed on 09/21/14 at http://www.greenwaste.com/recycling-stats
[5] How Much Waste Can You Save By Composting?, accessed on 09/08/14 at http://homeguides.sfgate.com/much-waste-can-save-composting-78547.html
[6] The Food Recovery Hierarchy, accessed on 09/11/14 at http://www.epa.gov/foodrecovery/

composting on-site for a school garden, then typically only uncooked plant-based food and eggshells are advised. Cooking oil/grease and other liquids should not go in the compost.
- Paper products: food-soiled paper, paper-based food containers, paper towels, tissues, waxed cardboard.
- Landscaping trimmings: grass clippings, wood (untreated), leaves, etc.

Note: there are many plastic products on the market now made from cornstarch, potato starch, and other plant material that are labeled compostable. These materials can be composted in some cities that send their organic waste to an industrial composting facility that can accommodate them. In other cities that offer composting, like Cupertino, these "bioplastics" or compostable plastics do not break down fast enough in the facility it uses, which has a shorter, non-industrial composting process. These plastics cannot be recycled, so if your city does not offer compost collection, it is best to throw them in landfill bin.

Materials that typically must go to landfill include:
- Chip bags, candy wrappers, condiment packets (materials that are really composed of two materials pressed into one, like plastic and metal foil that make a chip bag).
- Rubber
- Latex gloves
- Styrofoam

You will find there are some materials that do not fall into any of the categories above, and are difficult to sort. These may be products requiring special disposal, such as electronics, batteries, or cleaning supplies, which contain hazardous materials and cannot be sent to landfill. Check with your custodial staff and administration about how they handle these kinds of materials. For more examples of such materials, called "household hazardous waste", see Cupertino's page on the topic: http://www.cupertino.org/index.aspx?page=163.

Unit 1: Materials Management

➢ Team Activity | *Materials Sorting Challenge*

This activity helps students identify which items are compostable, recyclable, or neither. Teachers can simply show an item to the class (via projector, PowerPoint, photos, or even bring in old items such as packaging materials, bottles, cans, etc.). Try to get as many right answers as possible!

Write in each item and check off which category it fits into below:

	Item	Recycling	Compost	Landfill
1				
2				
3				
4				
5				
6				
7				

➢ Action Activity | *Is Your Garbage Really Garbage? Materials Sorting Challenge*

Use this interactive game to stimulate student critical thinking around their materials sorting habits. This exercise will build student knowledge of what items are recyclable, compostable, and what really is destined for the landfill. To complete this activity, you can either check out the City of Cupertino's Materials Sorting Game (comprised of laminated picture cut-outs of various items) or make your own. Contact your green@school coordinator (sustainability@cupertino.org) for help facilitating this exercise!

To conduct the exercise yourself, print a stack of images of different items (laminate if desired), including compostable, recyclable, landfill, and hazardous materials. Divide the class into groups and pass each a group of images to sort. Have the groups work together to sort the images into categories, asking which bin they would put the items in. Students can report items they had trouble with, and you can discuss them as a class. Then groups can swap images, so that each gets to tackle several sets of images. You can time this to get students used to making sorting decisions quickly.

Unit 1: Materials Management

➢ Group Activity | *Interesting Facts about Materials Management*

Share these mind-boggling facts with students to help them stress the importance of proper materials management to their peers, teachers, and family.

1. Over 75% of waste is recyclable, but we only recycle about 30% of it.[7]
2. The California Integrated Waste Management Act directs every jurisdiction to divert 50 percent of its waste stream starting the year 2000.[8]
3. Within California, Oregon, and Washington, recycling or composting many of the commonly found items in the disposed waste stream could reduce GHG emissions by more than 32 $MMTCO_2e$,(million metric tons of carbon dioxide equivalent),the equivalent of taking 6.3 million cars off the road for a year.[9]
4. E-waste (electronic waste) represents 2% of America's trash in landfills, but it equals 70% of overall toxic waste. The extreme amount of lead in electronics alone causes damage in the central and peripheral nervous systems, the blood and the kidneys.[10]
5. Americans generate 1.6 million tons of Household Hazardous Waste per year.[11]
6. We generate 21.5 million tons of food waste each year. If we composted that food, it would reduce the same amount of greenhouse gas as taking 2 million cars off the road.[12]
7. Biodegradable plastic cannot be recycled.[13]

Discussion: Review these facts and answer the following questions as a class:

1. Which of these facts seemed the most outrageous and why?
2. Which of these facts would you like to see change in the next 10 years?
3. How can YOU and/or green@school help achieve that goal?

[7] 11 Facts about Recycling, accessed on 09/14/14 at https://www.dosomething.org/facts/11-facts-about-recycling.
[8] Diversion Rate Measurement Before 2007, accessed on 09/12/14 at http://www.calrecycle.ca.gov/lgcentral/DivMeasure/
[9] ICLEI USA Sustainable Cities and Counties Blog, accessed on 09/22/14 at http://www.icleiusa.org/blog/how-recycling-and-composting-help-reduce-ghgs.
[10] 11 Facts about Recycling, accessed on 09/14/14 at https://www.dosomething.org/facts/11-facts-about-recycling.
[11] Questions About Your Community: What is Household Hazardous Waste?, accessed on 09/15/14 at http://www.epa.gov/region1/communities/hazwaste.html.
[12] 11 Facts about Recycling, accessed on 09/14/14 at https://www.dosomething.org/facts/11-facts-about-recycling.
[13] Myths and Facts about Biodegradable Plastics, accessed on 10/11/14 at http://1800recycling.com/2011/03/myths-facts-biodegradable-recycle-plastics.

Unit 1: Materials Management

➢ Student Activity | *Invite a Guest Speaker*

Hearing from an expert in materials management is not only a great way to find out how you can reduce your own impact, but also a good opportunity to learn about careers in this environmental field (http://www.epa.gov/epawaste/education/pdfs/career02.pdf). Work with your students to enable them to research who they can approach as guest speakers in the materials management space. These could be local government (people who manage garbage contracts, oversee waste management programs, environmental programs people, etc.), garbage haulers (community outreach staff) or representatives from recycling/composting/landfill facilities. Once your students propose a guest speaker, use the table below to guide the students to take notes during the presentation. Have them write down three questions to ask the speaker at the conclusion of their presentation.

Name/Title:	
Organization:	
Job Description:	
Email:	
Important websites:	
Question 1:	
Question 2:	
Question 3:	
Notes:	

Unit 1: Materials Management

➢ Professional Development Activity | *Field Trip: Sorting Facility/MRF*

Field trips are an exciting way for students to learn about real world activities and gain first-hand experience. To better understand how materials are managed and sorted in your area, access this directory: (http://www.calrecycle.ca.gov/SWFacilities/Directory/Search.aspx) to find a Materials Recovery Facility near your school to plan a field trip! Many offer tours that are very eye-opening to guests that will see mountains of waste being sorted into different commodities for sale both locally and overseas.

Lesson 3: Zero Waste School

Now that you and your students know how to properly sort waste, how can you take that to the school campus level? Can your school become a "zero waste" school, where everything that is used is composted, recycled, or reused in some way?

First, you'll need to assess what your current waste disposal system is at your school site. Are their sufficient collection containers in convenient locations? Are their bins for all the streams you want to collect (recycling, composting, landfill, or paper, plastic, landfill, etc.)? Are there any source reduction actions that could be taken by staff and students to help reach a zero waste school goal? Are there actions the custodial staff could take to help your school become a zero waste school? The following activities will help your students determine how to divert as much waste as possible from your school site.

➢ Action Activity | *Campus Materials Audit: How Does Your School Measure Up?*

Many factors influence the composition of you school's waste stream. Hauling services available, available disposal bins, materials used in classrooms, cafeterias, and other areas, student and staff sorting knowledge, extracurricular activities help on site, and more. Before proposing any changes to your school's waste infrastructure, it's a good idea to know what your waste composition looks like. To determine this, conduct a waste audit of the school site: assess the trash in waste bins of different campus areas (a classroom, cafeteria, gymnasium, bathroom, etc.) and describe what is being thrown away. Here's what to do:

Have gloves and trash grabbers on hand before starting. Before you start digging into any trash, note a few attributes of the bin(s) you are digging into. This will help you determine if people are sorting correctly, and if you have the right bins in each location for diverting waste:

Unit 1: Materials Management

Attribute	Description
Location *Is the location convenient? How could the location affect the findings of your audit?*	
Type(s) *(landfill, recycling, compost)*	
Labeling and Signage *What is the wording? Does it make sense? How could it be improved?*	
Size / Shape *Are the bins the same size? What does the opening of the bin look like?*	
Other Observations *Notice anything else interesting?*	

DIRECTIONS: Now it's time to get your gloves on and really dig in. Start with the waste from the trash bin. For each item you find, add a tally mark next to the appropriate item in the trash column. Once you finish all the items from the trash bin, move to the recycling bin. Add a tally mark next to the appropriate item in the recycling column. (Note: Do not worry about the first column, which reads landfill, compostable, and recyclable, until the next part of this audit. That is simply to let you know if the item can be composted, recycled on must go to the landfill).

Unit 1: Materials Management

	Items Found	Trash	Recycling
Landfill	Candy Wrappers		
	Chip Bags		
	Food Packaging		
	Polystyrene products		
	Other		
Compostable	Food		
	Paper towels/ napkins		
	Paper plates/cups/ etc.		
	Other		
Recyclable	Glass bottles/jars		
	Plastic Bags (or packaging)		
	Metal or aluminum cans		
	Plastic bottles		
	Paper products		
	Other Plastic Products		
	Cardboard		
	Other		
	TOTAL		

Unit 1: Materials Management

CALCULATIONS

Now that you've completed the dirty work, it's time to crunch some numbers. Although this data will represent a small part of the school's total waste, it can give you an idea of how successful your school is at diverting waste from the landfill.

1. Add up the total number of items._____
2. What percentage of items found can be recycled? [(Recyclables/ total amount)*100%]
   _____
   _____
3. What percentage can be composted?
   _____
   _____
4. What percentage is actually trash (going to the landfill)?[(landfilled/total)*100%]
   _____
   _____
5. What is the most common item found in any of the bins? Honorable mentions?
   _____
   _____

DISCUSSION: Here's some food for thought.

1. How well is your school at sorting waste? Which mistakes are the most common?
2. Are the present bins being used correctly? Are there adequate bins of each type? Are they easy to reach?
3. Which common items cannot be recycled or composted?
4. What alternatives to the landfill items exist? What alternatives to the disposable recyclable or compostable items exist?
5. Are there any other opportunities you can identify to either reduce waste or encourage sorting?

Unit 1: Materials Management

➢ Group Activity | *Sign Language*

The location, signage, and type of bins available can make a big difference in landfill diversion rates. As a green@school student, you have the power to maximize all of these variables! Look at the following labeling and signage schemes. Think about what you like about different signs, and what you don't. What would be most helpful to you in making a sorting choice? Then, get into groups and design your own bins!

	Label and Signage Schemes	Like (Why?)	Don't like (Why ?)
1.	 14		
2.	 15		
3.	 16		

[14] Gilmore Kramer, accessed on 10/2/14 at http://www.gilmorekramer.com/more_info/concrete_3_bin_recycling_waste_containers/images/concrete_3_bin_recycling_waste_containers.jpg.

[15] The Daily Circuit Blog, accessed on 09/30/14 at http://blogs.mprnews.org/daily-circuit/2012/09/are-you-happy-with-your-trash-recycling-and-composting-options/.

Unit 1: Materials Management

	Label and Signage Schemes	Like (Why ?)	Don't like (Why ?)
4.	 17		
5.	 18		
6.	 19		
7.			

[16]University of California, UC Newsroom, accessed on 10/21/14 at http://www.ucop.edu/newsroom/newswire/img/78/7880281554fbd44ff833f8.jpg.
[17] TCNJ Recycling Program, accessed on 10/04/14 at http://recycling.pages.tcnj.edu/information/where/
[18] Busch Systems International, accessed on 10/04/14 at http://www.buschsystems.com/2014/02/recycling-bin-customization-starts-here/
[19]UW Study Abroad, accessed on 09/27/14 at http://uwstudyabroad.files.wordpress.com/2013/06/japan-sorts-all-of-their-trash-even-the-recyclables-have-different-pickup-days-for-residences-and-bins.jpg.

Lesson 4: Environmentally Preferable Purchasing

Much of this unit so far has focused on what to do with material that becomes waste. Another important component of materials management practices is reducing material use before it even becomes waste. This is called waste reduction or source reduction, and helps conserve resources and keep material from reaching the landfill. One way to do this, on an institutional level, is environmentally preferable purchasing. Prioritizing products made with recycled content instead of new material, products made with less packaging, products that are recyclable or compostable, and reusable products over disposable ones, are purchasing decisions that can help reduce waste. Many organizations have what are called Environmentally Preferable Purchasing (or Procurement) Policies that provide such guidelines. Students could propose this kind of policy for their school, and/or provide information to their peers about making these kinds of decisions, *before* materials even get to the bins.

➢ Discussion Activity | *Video: The Story of Stuff*

The Story of Stuff Project, which was released in 2007, looks beyond recycling and composting and reflects upon the underlying consumption and production patterns that make up our daily lives. This is a great opener for discussing environmentally preferable purchasing decisions and waste reduction.

- The Story of Stuff (http://storyofstuff.org/movies/story-of-stuff/), 2007, Story of Stuff Project, Partner Group Media.

Discussion: Think about the following questions as you watch the video and discuss as a group.

1. Which of the 5 ecological R's (reduce, reuse, recycle, rot, re-think) does the Story of Stuff address?
2. What is the video's message? Did you find it effective? Why or why not?
3. Have you travelled to places where you've noticed differences in "stuff", such as the access to resources, or the amount of advertising, or the types of things available to purchase? If so, how did life seem different to you? What lessons can you draw from your observations of life at home and elsewhere?
4. After watching this video, do you feel you will look at your own "stuff" differently?

Unit 1: Materials Management

➢ Reading Activity | *Product Life Cycle: Cell Phone*

This interactive info-graphic (http://www.epa.gov/epawaste/education/pdfs/life-cell.pdf) provided by the US EPA will teach students about the product life cycle of a cell phone. This info-graphic also includes activities for students to understand what a product life cycle is. Show the students this compelling info-graphic and ask them to research other product life cycles such as a soccer ball or a carton of milk. Did they learn anything surprising about this product? Has anything changed about the way they think about this product?

➢ Student Activity | *Re-Use & Re-Purpose*

Terracycle (http://www.terracycle.com/en-US/pages/how-terracycle-works.html) is an innovative company that turns what others may view as waste into new, re-purposed and affordable products! There are more than 40 programs through Terracycle that collect hard-to-recycle items (such as food packaging and office supplies) and transform into new products. Encourage your students to choose a product as a class that they cannot recycle easily at home or at school and sign up. Bonus: schools can earn points that can be used towards charitable gifts or money for your school.

➢ Student Activity | *Interview*

Using the Materials Management Checklist and interview your school's faculty and staff responsible for your school's purchasing. Gather a list of products that each person purchases regularly, and research environmentally preferable alternatives to those products. Below are a few resources that can help identify alternative products to get you started:

Product Type	**Resource**
Cleaning products	www.greenseal.org www.ecologo.org www.epa.gov/dfe www.goodguide.com
Electronics	www.epeat.net www.energystar.gov
Paper products	us.fsc.org www.ecologo.org (Also, look to see if the product has recycled content!)

Unit 1: Materials Management

Lesson 5: Inspire Your School to go Zero Waste!

Diminishing fossil fuel resources, growing climactic changes, increasing air, water, and land pollution are just the few of the daunting impacts and concerns associated with the way we use dispose of our "stuff." But how can you and your school act to address these huge and growing problems? This lesson aims to guide students through effecting behavior change and implementing materials management initiatives on campus, a skill that can be taken home or applied across the community in student's future work as change agents.

➢ Professional Development Activity | *Develop a Zero Waste Campaign at Your School*

Develop a plan of action of how you will encourage your student body and school staff to divert and reduce waste. What is your message? What actions do you want other to take? How will you spread your message? Below are a few campaign ideas to get you started:

1. Design a zero waste schools campaign, educating your teachers and peers on how to properly sort materials, and challenging them to produce zero landfill waste.
2. Host a zero-waste event, where all waste is diverted from the landfill and either composted or recycled.
3. Design a Reuse Campaign that encourages your teachers and peers to swap one-time use items for reusable options.
4. Build a garden and/or compost area on your campus to help divert food waste from the landfill. Designate a school supply exchange space in common area, like a shelf or a table in a library or lunchroom, where students and staff can leave usable, unwanted items for others to reuse for free.
5. Propose an environmentally preferable purchasing policy to your administration.
6. Prepare a family-friendly version that students can take home with them to help their families make alternative purchasing choices as well.

Refer back to the introductory unit to access the campaign template and to find out how your school can apply for grants to support and implement your campaigns. Be sure to check out some other ideas to influence change at your school to reduce waste here. (http://www.epa.gov/epawaste/education/pdfs/toolkit/tools-f.pdf)

Unit 1: Materials Management

Materials Needed for Activities

To complete various activities in the Unit 1 lesson plan, you will need some tools and materials:

Tool	Picture	Description	Where you can get it
Gloves		Protect your hands while going through materials at your school.	Ask your school's custodian to borrow gloves, or ask your parents if you can bring some from home!
Calculator		Any simple calculator will do!	Ask your peers or teacher. Cellphones work too!
Clear bags and/or bins to sort materials		This will be useful for properly storing materials and to ensure you are not making a mess when doing so!	Contact your school's waste hauler to access free bins.
Trash picker *(optional)*		This will be useful for sorting materials into proper bins as well as picking up any litter on campus to place into proper bin.	Ask your school's custodian to borrow a trash picker if they have one on-site.
Labels		This will be useful to educate faculty, staff and peers on how to properly dispose of materials into correct bins.	Request these labels from your green@school coordinator or encourage students to make their own labels! 10300 Torre Ave. (408) 777-3362 sustainability@cupertino.org
Blank campus map		Keep track of where various bins are located on campus.	Ask your school administration for a blank map.