SUSTAINABILITY WORKSHOPS
for Middle School & High School Teachers

Local Sustainability Awareness: Where Does Trash Come From?

Argonne's Sustainability Workshops for Middle School and High School Teachers were conceived, designed and implemented as part of the Laboratory's educational outreach. The goals of these workshops include knowledge and awareness of alternative energy technologies, their advantages and limitations; the key issues and impacts of technologies related to climate change; to extend the resources of sustainability; and to encourage energy literacy. Participating teachers are asked to synthesize their experiences and knowledge gained into a useable lesson plan. The plans presented in this unit are a compilation of those lessons.

Grade Level

Middle School

Time Needed

1-2 class sessions

Activity Description

Students identify and classify varieties of solid waste, and the places that generate them. They then analyze and compare different places' proportions of solid waste categories, and compare it to national data. Students finish by brainstorming a list of ways that each place could reduce the amount of solid waste it generates, and suggest alternate things to do with the waste that *is* generated, rather than sending it to a landfill.

Goals and Objectives

Students will

- Discuss opportunities to reduce their ecological footprint
- Identify materials that are or should be thrown away
- Analyze data to determine which materials can be reduced, reused or recycled
- Recognize the importance of waste management
- Analyze national data on solid waste, and suggest ways to reduce the amount of waste

Background Information

While many of the issues we hear concerning sustainability are more nationally or globally focused, there can be a bigger impact when sustainable efforts are focused locally. The larger issues can be overwhelming and lead people to think that huge efforts must be made to achieve any results, and that they can't possibly contribute in any meaningful way; or that conservation efforts must be severe and major life changes that can be uncomfortable are the only ways to impact the problem.

However, local, sustainable efforts can be small changes that do not severely impact lifestyles, and still make a beneficial contribution to sustainability. Learning about recycling, reusing, repurposing, and using products that are made from sustainable, renewable materials are all small steps that can make a big difference. Awareness of impacts and local efforts starting in school or at home can then increase the awareness and actions of families and communities. Using this approach, many communities and utilities are increasing their efforts in engaging residents in sustainable efforts such as sponsoring electronic recycling events, curbside recycling, energy audits, and offering discounts to encourage home energy reductions.

Materials

- One box of items (or pictures of items) per team containing many examples of objects made of paper/cardboard, plastics, yard trimmings, metals, rubber/leather, textiles, wood, food, glass and other waste
- Student worksheet, one per student
- One computer per team with Internet access, or a single computer with U.S. EPA solid waste graph projected for all to see, or printed copies of U.S. EPA graph for each team

Vocabulary

recycle	reuse	
repurpose	sustainable	renewable

PROCEDURE

Introduce the Lesson

(10 minutes)

1. Provide student teams with a box full of items (or pictures of items) containing many examples of items made of: paper/cardboard, plastics, yard trimmings, metals, rubber/leather, textiles, wood, food, aluminum, glass and other waste.
2. Have student teams separate the items in their box into categories. Discuss categories with the teams, and as a class, decide how people working at a landfill might separate the items (guide students towards the categories listed above.)
3. Explain to the students that if you were to look into their garbage can, most (if not all) of these categories of items would be found on garbage day.

Activity

(15 minutes)

1. Remind students that garbage trucks do not collect trash only at houses. They also stop at other places. Have students brainstorm with their group about different places that a garbage truck also stops. (Examples: daycare centers, grocery stores, restaurants, movie theaters, parks, gyms, beaches, office buildings, etc.) Keep the list posted for all students to see.
2. From the list, assign one location of trash pickup to each team. Set the scene for the students: They have been hired as waste managers by the RRR Waste Company. Their job is to identify the variety of different items of garbage that their assigned place generates.
3. Using the student worksheet, have each team list all the solid waste items that can be found in their location.
4. Circulate and help those groups that seem to be stuck or finish too quickly. There are many items that each team can list.
5. Have the student teams classify each of the items on their list into the categories that had been identified earlier, as identified on the worksheet.
6. Bring the students back together as a whole class. Have each team share their location's list of types of items in the trash.

Analysis and Explanation

(15 minutes)

1. Have your student teams view the most recent EPA data showing what is in our trash.
2. Using the U.S. EPA data, ask the teams to discuss the data and answer the reflection questions on their worksheet.
3. As a whole class, have students discuss/argue/defend their different thoughts about the proportions of solid waste and waste problems in the U.S.
4. Finish the discussion by having the teams brainstorm a list of ways that their location could reduce the amount of solid waste they generate, and suggest alternate things to do with the waste that *is* generated rather than sending it to a landfill.

Teacher Note: If students seem stuck, explain that most organizations do not recycle or re-use items. Students could identify ways that all of the categories could be recycled, reused (including composting) or reduced.

Assessment

- Qualitatively, observe the student interaction in the discussion, acquisition and articulation of new ideas and grasp of big ideas.
- Using a teacher-made rubric, observe each student's behaviors and contributions to their group's work.
- Create an exit slip that each student completes and turns in as they leave the room to answer a question such as, "What type of solid waste takes up the most space at landfills? What are 3 actions that can be done to decrease this?"

Extensions

- Have students watch one of the various videos/video clips discussing the nation's waste problem. Have students write a reflection on the video. Videos may include:
    - "Solid Waste Management," Miami Dade TV, Jun 18, 2012
    - "Away: A Story of Trash," STPetersberg College, May 11, 2011
    - Bill Nye the Science Guy: Garbage, mychannelofscience, May 9, 2013
- Help students think "outside the box" to creatively identify alternative ways to re-use common items, preventing them from becoming landfill. Start this activity by sharing photos or objects that have been "re-purposed." Some examples can include items such as old gym shoe herb gardens, wooden door frame chalkboards, old wagon garden planters, or any number of objects that can be found on a site such as Pinterest. (Hint: search for "re-purposed junk" to find many creative photos.) Then direct students' attention to a collection of random objects collected on a table. Ask the students to brainstorm other uses for these objects. Students can present their best ideas and, as a class, decide how they will use each of the objects. Allow teams of students to proceed repurposing the objects. Alternatively, allow students to find one item at home to repurpose, and bring in complete projects or photos of their work to showcase in a student exhibit.

Resources

- Student worksheet (at the end of this document)
- "Wastes - Non-Hazardous Waste - Municipal Solid Waste," US Environmental Protection Agency, last updated on 06/17/2013, viewed 7/27/2013.
- "Solid Waste Management," Miami Dade TV, Jun 18, 2012
- "Away: A Story of Trash," STPetersberg College, May 11, 2011
- Bill Nye the Science Guy: Garbage, mychannelofscience, May 9, 2013
- "Repurposed Junk," Pinterest, Allison Swick-Dutting, n.d., June 2013.

Need more information or help with this lesson?

Contact Argonne National Laboratory by e-mailing SustainabilityEd@anl.gov.

Find out more about Argonne's Sustainability Program at blogs.anl.gov.

Local Sustainability Awareness: Where Does Trash Come From?
Student Worksheet

Name _____ Block _____

Make a list of places where our trash comes from below. *To get you started, here are a few ideas:*

Restaurants, Libraries, _____

_____

_____

_____

Name the source assigned to your group. _____

List as many different items of trash that your source can generate:

_____

_____

_____

_____

Write each item of trash (listed above) into one of the following categories:

Paper/cardboard	Plastics	Yard trimmings
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Metal	Food	Plastic
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Rubber/Leather	Wood	Textile/Cloth
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Look at the pie graph: *What's in our trash*?
(http://www.epa.gov/osw/nonhaz/municipal/index.htm)

Next to the category titles on this activity, add the percent of garbage each category represents.

Reflection Questions:

1. Which category has the largest amount of solid waste?_____
2. Which category has the least amount of solid waste? _____
3. Were you surprised to find out the actual figures? _____ Explain.

4. How does the amount and category of waste from your source compare to other sources? Why do you think it turned out this way?

5. Based on your data from this activity, explain what you know about the nation's trash problem. What evidence makes you believe this to be true?

6. Brainstorm a list of ways that your location (and others) could reduce the amount of solid waste they generate, and suggestions of alternate things to do with the waste that *is* generated than sending to a landfill.