Unit 1

ENGLISH: LEARN ABOUT WASTE IN TWO LANGUAGES

LESSON DESCRIPTION

This lesson will allow students to learn about waste management. The students will be able to apply observation, listening, and comprehension skills through an educational video where they will reflect about reducing, reusing, and recycling waste.

Fuente: *https://encrypted-tbn0.gstatic.com/images?q=tbn:AND9GcRhWLYJGWkx0W_JqV-KpXdMOOVv-9d4LUHfbpoVCaSCE3c1YiTwKw*

APPLICATION OF THE LESSON PLAN

The lesson plan corresponds to the Unit 2.1 of English. The plan should be used following a discussion on the topic: being bilingual and the use of common words.

STANDARDS AND INDICATORS

- Speaking: Participate in class discussions, groups, and classmates, listening attentively, following instruction on turns, realizing questions with security and using complete sentences, about personal experiences and texts. (2.S.1)
- Reading: Asking questions that help determine or clarify meanings of words and/or phrases in texts. (2.R.4l)
- Redaction: Writing to express feelings, family topics, experiences, and describe an image; using high frequency and level appropriate common words to write complete sentences. (2.W.1)

LEARNING OBJECTIVES

- Use common words in the redaction of simple sentences.
- Remember actions that promote reusing, reducing, and recycling waste.

TEMPORALITY

Start (10 minutos)	**Development** (35 minutos)	**Closing** (15 minutos)

MATERIALS

- Blackboard/Whiteboard
- English-spanish/Spanish-english Dictionary
- Computer with CD
- CD with video
- Digital Projector

- Worksheets (one per students)
- Construction paper sheets (one per student)
- Markers
- Masking tape
- Chalk or Whiteboard markers

VOCABULARY
● Recycle: is to transform old products into new ones so that they can be re-sold. ● Reduce: generate less waste. ● Reuse: is to take old articles that could appear to be waste and give it new use.

CLASS GUIDE

START
● The teacher will realize a rain of ideas with the words reuse, reduce, and recycle. ● The teacher will ask three volunteer students to look for the definition of these words in the english dictionary. ● The teacher will ask three volunteer students to look for the definition of these words in the dictionary the translation of these words. ● The teacher will ask three volunteer students to look for the definition of these words in the spanish dictionary. ● After discussing the words and their definitions, the teacher will listen to the actions students realize to promote reducing, reusing, and recycling waste.

DEVELOPMENT
Instructional Activities
Video: 20 min ● The teacher will present a video about the three "R" (recycling, reducing, reusing). The following link correspond to the video *The 3 R's for Kids:* https://www.youtube.com/watch?v=TjnNOCbuoCA ● Following the video, the teacher will ask which of the characters in the video realized actions that were directed towards the effective management of waste to protect the environment. ● The teacher will offer an explanation about the importance of waste management. In the explanation the teacher will establish a relation with the vocabulary words and climate change (consult Attachment 1).
Worksheet: 15 min ● The teacher will hand out the worksheet to each student. ● The teacher will explain the following instructions: 1. In the worksheet the students will redact two simple sentences using common words. These will be written in english and its spanish translation. The sentences will

be related to the actions that the students can do to recycle, reduce and, reuse in their home (see Attachment 2).

2. The teacher will turn in a sheet of construction paper to each student so that he/she writes a third sentence with the translation in spanish, using the same topic of point #1.

CLOSING

- Work discussion:

1. The students will turn in the construction paper sheet with the sentence written in spanish and english.
2. The teacher will mix the sheets and will paste them randomly on the board.
3. The students along with their teacher will review 5 sheets. They will review the sentences written in english and their translation so verify if they are correctly written. They will also identify common words used in the sentence written in english.
4. Class summary: the teacher can offer a summary of what was learned or they may ask a student to do the summary.

Attachment 1. Educational resource for the teacher

www.grrn.org/page/zero-waste-and-climate-change

GRRN
GrassRoots Recycling Network

Zero Waste and Climate Change
Zero Waste, Recycling and Climate Change

Bill Sheehan, Ph.D.
GrassRoots Recycling Network
October, 2000

Save Energy | Save Forests | Landfills, Incinerators and Composting | Take Action

High levels of energy and materials consumption in industrial countries are the driving force behind the decline in virtually all major life support systems on Planet Earth. Over the last decade an increasing number of scientists and other thoughtful people have come to conclude that modern levels of materials and energy consumption are having a destabilizing influence on the world's atmosphere.

Energy consumption contributes directly to climate change by adding carbon-based molecules to the atmosphere in excess of naturally occurring amounts. Carbon molecules, primarily carbon dioxide from burning petroleum products, trap radiant heat and keep it from escaping from the Earth's atmosphere. The resulting warming of the air is changing our global climate.

Materials consumption contributes indirectly to climate change because it requires energy to mine, extract, harvest, process, and transport raw materials, and more energy to manufacture, transport and, after use, dispose of products.

The United States consumed 30 percent of the materials produced globally in 1995, while it accounted for less than 5 percent of the world's population.[1] Of all the materials used in products, only 1 percent is used in products 'durable' enough to still be in use six months later, according to industrial ecologist Robert Ayres. This wasteful consumption of materials wreaks havoc on our land and water resources. What's seldom appreciated is that it also wreaks havoc on our atmosphere and contributes to climate change. Waste prevention and recycling are critical to stopping climate change.

A growing international Zero Waste Movement is calling for radical resource efficiency and eliminating rather than managing waste – strategies that have major benefits for slowing climate change. There are zero emission cars and zero accident worksites; Zero Waste is a goal for how we should responsibly manage materials and the energy required to make them. Zero Waste is a 'whole system' approach to resource management that maximizes recycling, minimizes waste, reduces consumption and ensures that products are made to be reused, repaired or recycled back into nature or the marketplace. As Jeffrey Hollender, President of Seventh Generation puts it, "Zero Waste is the mother of environmental no-brainers."[2] For suggestions on how to get involved with the Zero Waste movement, read the section below, Take Action

Zero Waste systems – including waste prevention and recycling -- reduce greenhouse gases by:

1. Saving energy – especially by reducing energy consumption associated with extracting, processing and transporting 'virgin' raw materials manufacturing with recycled materials uses less energy overall compared with manufacturing using virgin materials;
2. Increasing carbon uptake by forests (recycled paper, for example, leaves more trees standing so they can breathe in our carbon dioxide); and
3. Reducing and eventually eliminating the need for landfills (which release methane) and incinerators (which waste energy relative to recycling and reuse).

1. Recycling, Waste Prevention and Product Redesign Save Energy top
Wasting materials causes massive amounts of energy to be used to extract and manufacture natural resource replacement materials. Reducing material use through **waste prevention** and increasing material efficiency through **product redesign** have the greatest beneficial impact on climate change. **Recycling** adds further to greenhouse gas savings by reducing the need for energy-intensive resource extraction.

The U.S. Environmental Protection Agency estimates that by **cutting the amount of waste we generate** back to 1990 levels, we could reduce greenhouse gas emissions by 11.6 million metric tons of carbon equivalent (MTCE), the basic unit of measure for greenhouse gases. **Increasing our national recycling rate** from its current level of 28 percent to 35 percent would reduce greenhouse gas emissions by 9.8 million MTCE, compared to landfilling the same material. Together, these levels of waste prevention and recycling would slash emissions by more than 21.4 million MTCE – an amount equal to the average annual emissions from the electricity consumption of roughly 11 million households. [3]

Manufacturing using recycled rather than virgin material saves substantial energy in virtually every case.[4]

[image of table: Virgin Materials - virgmat.jpg - locate]

- Net carbon emissions are four to five times lower when materials are produced from recycled steel, copper, glass, and paper. They are 40 times lower for aluminum.[5]
- Making a ton of aluminum cans from its virgin source, bauxite, uses 229 British thermal units (Btus). In contrast, producing cans from recycled aluminum uses only 8 Btus per ton, an energy savings of 96%.[6] Despite this, 45 billion aluminum beer and soft drink cans were wasted in the U.S. in 1998.[7]
- Likewise, extracting and processing petroleum into common plastic containers (No. 1 'PET' and No. 2 'HDPE') takes four to eight times more energy than making plastics from recycled plastics. Yet the recycling rate for these plastic containers was only 20.2% in 1998.[8]

Of course, energy conservation is just one of the environmental benefits attained by eliminating waste, increasing material efficiency and manufacturing products from recycled rather than virgin materials. As noted by Jeffrey Morris, virgin materials extraction (including drilling, digging, cutting, refining, smelting, and pulping) also: "(1) releases chemical substances, carbon dioxide, waste heat and processing refuse into air and water and onto land; (2) impairs the health of people exposed to polluting chemical releases; (3) dislocates and destroys habitat for a wide variety of non-human creatures and organisms; (4) diminishes productivity in natural resource industries that depend on healthy species and ecosystems; (5) impairs ecological functions and biological diversity in ecosystems; and (6)

alters the sights, sounds, smells and feelings humans enjoyed in many previously pristine, natural places."[9] Such consequences create an important difference between recycled material– and virgin material–based systems that is not adequately captured by life-cycle inventories.

2. Recycling, Reducing Paper and Wood Use Save Forests that Suck Up Carbon from the Atmosphere top

Recycling a ton of paper saves about 24 trees, which absorb 250 pounds of carbon dioxide from the air each year, reducing the global greenhouse effect.[9a] Trees take carbon from the atmosphere and store it in their tissues for long periods.

In the United States, the amount of forest land (33 percent of total land surface area) has remained fairly constant during the last several decades. Intensive tree farming practices and regeneration of previously cleared forest areas (particularly in the East) have offset tree harvesting and urban sprawl into forested area, resulting in an annual net uptake (i.e., sequestration) of carbon.[10]

While the net increase in tree biomass in the United States is good news for climate change, it is not necessarily good news for biodiversity or other aspects of environmental quality. That's because the dominant trend in forestry today is harvesting by clear-cutting and conversion of ecologically complex forests to single-species, single-aged tree farms. E.O. Wilson, a Harvard biologist and Pulitzer Prize winner, estimates that a pine plantation contains 90 to 95 percent fewer species than the forest that preceded it. The U.S. Forest Service estimates that pine plantations now make up 36 percent of all pine stands in the South and within 20 years will make up 70 percent.[11]

More importantly, waste prevention and recycling reduce greenhouse gases by saving trees that take up carbon dioxide. Protecting and restoring diverse forests requires addressing the staggering waste of forest products. Consider:

- The U.S. sends more paper to landfills and incinerators than all of China even uses, despite its being the world's second largest consumer.[12]
- While the timber industry touts advances in paper recycling, unsustainable paper wasting rates are seldom mentioned: 58.3% of all paper and paperboard is dumped in the landfill or burned in incinerators.[13]
- Paper and wood account for almost half of all waste that goes to landfills and incinerators. Forest products (paper and wood) constitute 38.3% by weight of 'municipal solid waste' and 51.9 percent by weight of all products (i.e., excluding food scraps and yard trimmings) sent to municipal waste facilities.[14]
- Wasted paper alone constitutes 48 percent of the greenhouse gases emitted during the production of products that wind up in a ton of 'municipal waste' sent to landfill, and 64 percent of commonly diverted waste.[15]

3. Reducing Landfilling and Incineration cuts Methane, Saves Energy top

Landfills and incinerators contribute to global climate change by destroying resources, causing more new resources to extracted (see Section 1 above). We mixed 156 million tons of used products and packaging together in 1997, called it trash, and buried or burned it. Then we extracted from the environment billions of tons of virgin materials to make new products and packaging to replace those we wasted.

We should not just look at weight diverted as a measure of system performance, but rather prioritize recovering for reuse and recycling the materials that otherwise would waste so much if they had to be replaced by products made from scratch from natural resources. For example, some complain, "Why all the talk about soft drink containers when they are only 2

per cent of the waste stream?" Well, aluminum cans only comprise 1.4 percent of the entire waste stream by weight, but they contribute ten times as much -- 14 percent -- of the emissions embodied in a ton of divertible waste sent to landfill.[16] Likewise, as the graph above shows, plastic containers take large amounts of energy to manufacture.

Landfills and Methane Landfills are the top human-caused source of methane: 36 percent of human caused methane releases come from our municipal solid waste landfills, according to the U.S. Environmental Protection Agency.[17] Organic materials (derived from living organisms) produce methane in landfills when they decompose without oxygen, under tons of garbage. Methane gas is a potent greenhouse gas, 21 times more effective at trapping heat in the atmosphere than carbon dioxide. A ton of municipal solid waste landfilled produces 123 pounds of methane. [18]

Some landfills operators try to recover methane. This is a voluntary effort at all but the largest landfills. According to one expert, "60% is about the best recovery of methane being reported, and most landfills that collect methane recover somewhere around 40%." In 1996, only 14 percent of landfill methane was captured (most landfill methane is flared on site, some is used to produce energy). [19]

Landfills vs. Composting Current 'state of the art' landfill design aims to entomb garbage and keep it dry forever. Many engineers, and even U.S. EPA, acknowledge that this is impossible, that all landfills will eventually leak and pollute groundwater. Recently, new systems are being developed, called 'bioreactors,' to try to capture methane more effectively. By recirculating leachate (garbage juice) and adding water, decomposition rates can be increased, making methane recovery more economical. This also compacts garbage, further increasing the value of remaining landfill space.

From the limited perspective of managing waste, this may seem reasonable. But from a Zero Waste perspective of managing resources, bioreactors make little sense. Over 62 percent of what gets buried in municipal landfills is readily recyclable or compostable organics, including paper, wood, yard trimmings and food scraps.[20] Organic material is needed to replenish our depleted, eroding and artificially-fertilized soils.

Yet when paper, wood, yard trimmings and food scraps are mixed with the myriad toxic products in household and industrial waste, they become too contaminated to apply to soils. The rational solution is to separate clean organics at the source and compost them into soil amendments.

When done properly, both centralized and backyard composting generally result in no net greenhouse emissions, according to U.S. EPA. Somewhat like trees, application of yard trimmings compost to degraded agricultural land results in carbon storage (more so at low rates than at high rates).[21]

Incineration vs. Recycling One might think that burning garbage for energy production would ameliorate global climate change by reducing the need to burn other fuels. There are two serious problems with this notion.

First, any gains in energy are outweighed by the production of toxic emissions and toxic ash, even in 'state-of-the-art' incinerators. Incinerator emissions of acid gases, mercury, dioxins and furans have led to widespread protests in North America, Japan and continental Europe, forcing the closure of plants and the abandonment of plans for new ones. In the U.S., 248 new municipal incinerators have been blocked and the number still in operation has fallen from 170 in 1991 to 119 in 1998. In 1997, 17 percent of U.S. municipal discards was burned (in a relatively few states), 55 percent was landfilled and 28 percent was recycled.

Second, the energy produced by burning garbage is only a quarter of the energy saved by recycling. Recycling used resources has energy impacts, but they are much less than burning those materials. Richard Denison of Environmental Defense examined detailed life-cycle studies and concluded:[22]

- When all activities entailing energy use are tallied, MSW [municipal solid waste] incineration results in only 28% of the net reduction in energy use realized through residential MSW recycling.
- Within the waste management system itself, recycling uses somewhat more energy than the other options; system-wide, however, recycling uses the least energy by a large margin.
- From a system-wide view, recycled production plus recycling collection uses the least energy, considerably less than virgin production plus incineration … This difference is due to the substantial reduction in energy use associated with manufacturing processes that use recycled materials relative to those that use virgin materials.
- Transportation energy required to ship processed recyclable materials to market (i.e. points of remanufacture) is quite modest, amounting to at most a few percent of manufacturing energy.

Take Action: Getting to Zero top

Implementation of Zero Waste resource management systems is arguably one of the most important steps to the sustainability of the earth's atmosphere and ecosystems. Zero Waste confronts the whole idea of endless consumption without needing to say so, by enabling even those who are locked into the system to challenge their own behavior in a positive way without immediately threatening it.

The GrassRoots Recycling Network (GRRN) has been spearheading the North American arm of a growing international movement that promotes Zero Waste as essential to reversing current unsustainable resource practices and policies. GRRN is building effective coalitions and partnerships for Zero Waste policies based on government, corporate and individual accountability for waste.

GRRN has identified the following outcomes as essential to move us towards a Zero Waste society: (a) Extended Producer Responsibility for Waste; (b) Consumer Action Against Wasteful Corporations; (c) Deposit Programs; (d) Jobs Through Reuse and Recycling; (e) Incentives for Reducing Trash; (f) Full-Cost Accounting and Life-Cycle Analysis; (g) Minimum Recycled Content; (h) Ending Subsidies for Extracting Virgin Resources; (i) Shifting Taxes from 'Goods' to 'Bads'; (j) National Resource Policy; and (k) Campaign Finance Reform.

Recognizing that the implementation of Zero Waste is a long-term, ambitious goal, a key component to our outreach is to educate other organizations whose work/mission might not be readily identifiable as impacted by Zero Waste. Practical strategies and actions can be taken by all sectors of society in all institutions. GRRN invites all interested parties to join GRRN's campaigns and share your experiences on our listserve, GreenYes.

Fuente: http://www.grrn.org/page/zero-waste-and-climate-change

Additional sources of information:

- Reduce, reuse, recycle:
  http://www.ecokidsusa.org/3rs.html

- Recycling guide:
  http://www.recycling-guide.org.uk/

- Recycling and climate change:
  http://plantops.umich.edu/grounds/recycle/climate_change.php

Attachment 2. Worksheet

The 3 R's

Name: _____ Date: _____

Read and complete the following excersices:

1. Write two sentences using sights words about actions that you would do in your house related to reducing, reusing and recycling waste.

2. Translate the two sentences in Spanish.

Sentence #1

English:

_____

Spanish:

_____

Sentence #2

English:

_____

Spanish:

_____

REFERENCES

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