

# CASE STUDY - UNIT 1

## The Case of the School Cafeteria

### Teaching Instructions

#### Overview

In this case study, students analyze a problem concerning the large amount of trash generated by a school cafeteria. All students can easily identify with this problem, and probably will have some definite opinions about the solution. This problem is not at all hypothetical. Many schools are considering ways to reduce the large amounts of trash generated by their lunch programs.



#### Learning Objectives

After completing the case study, students will:

1. Apply the Five-Step (PACED) decision model to solve a problem.
2. Identify the five basic methods of solid waste disposal: source reduction, reuse and recycle, composting, landfilling, and combustion.
3. Understand that policy decisions usually involve trade-offs.
4. Identify the opportunity costs of various choices.

#### Prerequisite Skills

Students must know how to apply the Five-Step (PACED) decision-making model used in many curriculum materials of the National Council on Economic Education ([www.ncee.net](http://www.ncee.net)). This involves making decisions based on personal and group criteria/goals and communicating ideas in a group setting.

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This lesson originally appeared in *Energy, Economics, and the Environment: Case Studies and Teaching Activities for Middle School*, Indiana Department of Education, 1994.



## Important Concepts to Emphasize

**All Production/Consumption Creates Some Kind of Waste.** There is always some kind of waste whenever goods or services are produced and consumed. In the case study, even if all of the girls' recommendations were adopted, waste still would be put into the environment. Instead of trash, the cafeteria would have to get rid of dirty, soapy dishwater. If the water temperature is below a certain level, the cafeteria would have to use chemical drying agents that would enter the environment. Using dishwashers requires using energy, which has an impact on the environment.

**Methods of Dealing with Solid Waste.** Students should learn these five basic methods for dealing with solid waste.

- a. **Source Reduction** - reducing the quantity and toxicity of waste at its source.
- b. **Reuse and Recycle** - extending the life of resources by using them again in production or consumption.
- c. **Composting** - decomposing organic matter to create humus.
- d. **Landfilling** - compacting waste and covering it with soil.
- e. **Incineration (Combustion)** - burning solid waste (Nonburnable waste is separated first).

**Every Decision Has an Opportunity Cost.** Because of scarcity, there is always a best alternative not chosen, and thus, there is always an opportunity cost. In the case study, if all the girls' recommendations are accepted, the opportunity cost will be the \$1 (.20 X 5) worth of other things that each student cannot buy each week. Also, the opportunity cost would include the other things teachers and students could be doing with the extra 15 minutes that must be added to the school day. This is not to say that the girls' recommendation is flawed; rather, there are opportunity costs that must be considered. Of course, there is an opportunity cost to **not** accepting the recommendation - the benefit gained from having less waste in the landfill.

**All Policy Decisions Involve Trade-Offs.** People usually are willing to give up part of one goal to obtain part of another. For example, one alternative solution to the case study might be to accept part of the girls' recommendations. The parties could agree to use washable trays and silverware while retaining paper napkins and

milk cartons. There still would be more trash than the girls desired, but the price of lunch would not have to be increased drastically (the increase would depend on the specific calculations), nor would the school day have to be extended.

**Recycling Is Not Costless.** Recycling is a worthy goal; however, it is not a costless one. Those involved in recycling programs (collectors, processors, etc.) must be paid for their services. One of the main problems is that there are not enough processing facilities to handle large amounts of recyclable materials. Thus, there may be no market at all for some recycled materials, or the prices for materials may be too low to cover the costs of a recycling program. As a general rule, recycling program costs are greater than revenue. However, the **net costs** of a recycling program may be less than waste disposal costs, making recycling a cost-effective option.



### Teaching Suggestions

1. Hand out the case study scenario. Divide your class into small groups, and let each determine a solution to the case study. Have groups report their solutions to the class.
2. Review the Five-Step (PACED), decision-making model. 1. Define the **P**roblem 2. List **A**lternatives 3. Identify **C**riteria/Goals 4. **E**valuate Alternatives Against the Criteria 5. Make a **D**ecision. Show students how to use the Decision-Making Grid. (See end of lesson.)
3. If your students have not had much experience using the Five-Step model, you may wish to suggest several of the criteria to begin the activity.
4. You can use other criteria than those listed in the sample Decision Grid. Three alternative solutions are listed in the Answer Grid; however, for this first lesson your class could consider just the two most basic alternatives - Accept Recommendations and Reject Recommendations.

Notice that we used the +/?/- marking scheme, using double + +'s and - - 's for emphasis. Do not be surprised if you or your students disagree on how we marked certain cells in the grid. Some disagreement is natural. The purpose is to clarify the analysis and to better understand the trade-offs among criteria/goals.

You may wish to have students write comments below the markings. We recommend this, because it forces students to express their logic verbally.

Notice that there is not necessarily a "correct" answer because conflicting personal values will cause students to weigh the criteria differently.

5. To extend this lesson, discuss the charts: What's in Our Garbage and Tipping Fees by Selected States.



### Key Questions To Ask Students

1. What is a landfill? (*site of the controlled burial of solid waste*) What is solid waste? (*all solid and semi-solid waste, including garbage; trash; yard and industrial waste; and household discards such as appliances*) What is trash? (*material considered worthless that is usually thrown away; generally defined as dry waste material; often used interchangeably with the word "garbage."*)
2. Why is solid waste disposal a challenging issue in the United States? (*The **volume** of waste generated has increased greatly, and the **composition** of the waste is different from earlier days - less biodegradable and more toxic. Also, it is becoming more politically difficult to start new landfills.*)
3. What are five ways to dispose of solid waste? (*Source reduction, reuse and recycle, composting, landfilling, and incineration.*)
4. What are some of the ways that the concept of **scarcity** is illustrated in this case study? (*Scarcity of money, scarcity of environmentally safe landfill sites, and scarcity of time in school day.*)
5. "Almost all production results in some type of waste." True or False. Discuss. (*True. In our problem, washing dishes instead of using throwaway items still results in waste, albeit, a different kind!*)
6. In the case study, what was the opportunity cost of accepting the girls' recommendation? (*Giving up whatever the students would have bought each week with the extra \$1 now spent on lunch and giving up 15 minutes of after-school activities.*)
7. What was the opportunity cost of **not** accepting the girls' recommendation? (*Giving up the environmental benefits of having less trash in the landfill.*)

8. Why wasn't recycling considered in the girls' recommendation? *(There weren't any local processing facilities for the plastic trash, and there was no market for lightweight paper napkins and milk cartons.)*

| <b>DECISION GRID ANSWER KEY</b><br><b>The Case of the School Cafeteria</b>          |                   |             |          |                            |
|---|-------------------|-------------|----------|----------------------------|
| <b>CRITERIA</b>   |                   |             |          |                            |
| <b>ALTERNATIVES</b>   | Helps Environment | Lunch Costs | Fairness | Extra School Time Required |
| Accept girls' recommendations   | +                 | - -         | +        | - -                        |
| Accept some recommendations (wash trays and silver; keep paper napkins and cartons) | ?                 | ?           | +        | + +                        |
| Reject girls' recommendations (Do nothing)  | -                 | +           | ?        | + +                        |

# WHAT'S IN OUR GARBAGE?

## 2005 Total Waste Generation

245 Million Tons (before recycling)

| <u>Amount (2005 data)</u> | <u>Millions Of Tons</u> | <u>%</u> |
|---------------------------|-------------------------|----------|
| Paper and paperboard      | 83.8                    | 34.2%    |
| Glass                     | 12.7                    | 5.2%     |
| Metals                    | 18.6                    | 7.6%     |
| Plastics                  | 29.2                    | 11.9%    |
| Food scraps               | 28.7                    | 11.7%    |
| Yard trimmings            | 32.1                    | 13.1%    |
| Wood                      | 14.0                    | 5.7%     |
| Rubber, leather, textiles | 17.9                    | 7.3%     |
| Other                     | 8.3                     | 3.4%     |
| Total                     | 245                     | 100      |

Source: Basic Facts, Municipal Solid Waste, Environmental Protection Agency,  
<http://www.epa.gov/epaoswer/non-hw/muncpl/facts.htm>

## Landfill Tipping Fees (\$/ton)

| Region        | 2004  | 1995  | 1990  | 1985  |
|---------------|-------|-------|-------|-------|
| Northeast     | 70.53 | 73.17 | 64.76 | 12.66 |
| Mid-Atlantic  | 46.29 | 45.68 | 40.75 | 16.99 |
| South         | 30.97 | 28.50 | 16.92 | 3.24  |
| Midwest       | 34.96 | 31.15 | 23.15 | 7.23  |
| South Central | 24.06 | 20.30 | 12.05 | 7.24  |
| West Central  | 24.13 | 23.29 | 11.06 | 5.36  |
| West          | 37.74 | 37.69 | 25.63 | 10.96 |
| National      | 34.29 | 32.19 | 23.01 | 8.20  |

**Regions**

Northeast: CT, ME, MA, NH, NY, RI, VT

Mid-Atlantic: DE, MD, NJ, PA, VA, WV

WY

South: AL, FL, GA, KY, MS, NC, SC, TN

Midwest: IL, IN, IA, MI, MN, MO, OH, WI

South Central: AZ, AR, LA, NM, OK, TX

West Central: CO, KS, MT, NE, ND, SD, UT,

West: AK, CA, HI, ID, NV, OR, WA

Source: National Solid Waste Management Association (NSWMA), *NSWMA's 2005 Tipping Fee Survey*, NSWMA Research Bulletin 05-3 March 2005

## The Case of the School Cafeteria



### Student Directions:

Below is a situation about trash waste in a school cafeteria:

1. Analyze the situation and use the Five-Step (PACED) decision model to decide which recommendations should be followed.
2. You must complete the Decision Worksheet and the Decision Grid.
3. Be prepared to defend your final decision.

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### Scenario:

Christy and Maria were best of friends who always ate lunch together in their middle school cafeteria. One day, while they were waiting for the 12:40 bell to ring, Christy noticed that trash from lunch filled four large garbage cans. This really didn't surprise her since school lunch was served on plastic throw-away trays and students used throw-away plastic spoons and forks. Combine that with the empty milk cartons, the paper napkins, and the lunch bags brought from home, and all this created a lot of trash!

"What a waste!" exclaimed Christy. "Maria, why don't we use reusable trays and silverware in our cafeteria? It can't be that big of a deal to wash them. Just think about our local landfill getting filled up with solid waste. Our cafeteria is really contributing to the problem."

"Don't worry about it," answered Maria. "What can you do about it anyway?"

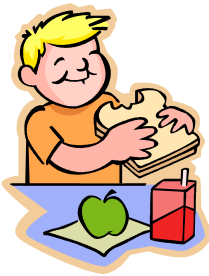
"Let's ask Mrs. Clifton if we can discuss it at the next student council meeting," responded Christy. "I bet she wouldn't mind."

"That's not a bad idea," said Maria. "She might be interested. It's worth a try."

As it turned out, Mrs. Clifton, the student council advisor, thought it was a very important topic to discuss. In fact, she asked the principal, Mr. Harris, and the cafeteria manager, Mrs. Downing, to attend the next student council meeting. On the day of the meeting, Christy and Maria explained their concerns.

"We have learned that recycling the plastic items wouldn't work," explained Christy, "since there are no available processing facilities for these items, and there is no market for recycling the paper napkins and milk cartons. However, by following this plan, the school cafeteria can eliminate most of its trash."

1. Use reusable hard plastic trays and metal silverware, instead of the disposable kinds. The reusable trays and silverware could be washed easily.
2. Use cloth napkins, which also could be washed and reused instead of paper napkins.
3. Use washable regular glasses instead of disposable milk cartons. Students would get milk from large dispensers like those found in some restaurants.

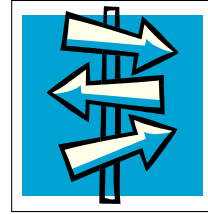


Unfortunately, Mrs. Downing stated her concerns about the girls' plan. "It sounds good, but I'd have to pay a lot more in labor costs if we washed trays and silverware by hand, and that's expensive. Even if we bought dishwashers, there would be some additional labor costs. Anyway, dishwashers are expensive, and there are repair costs. And have you thought about the additional water and the increased energy costs for heating the water? Also, don't forget that trays, glasses, silverware, and cloth napkins break, wear out, or can be stolen. They're expensive to replace. If we implement all of your recommendations, we'll have to increase the price of lunch from \$2.00 to \$2.40."

Mr. Harris also stated his concerns. "It would take more time to get students through the lunch line if students filled their own glasses of milk. Students already are pressed for time to finish their lunch. We'd probably have to add five more minutes to each of our three lunch periods. That would mean getting out of school fifteen minutes later each day. Are students willing to do this?"

"I can see your concerns," said Christy, "but someone has to make sacrifices. I still think our solution is best for the environment, and nothing is as important as saving the environment."

# Decision Worksheet



## Student Directions

1. Complete this worksheet and the Decision-Making Grid to help you analyze the case study.
2. (Optional) Below the evaluation marks you place in each cell of the decision-making grid, make a brief comment explaining **why** you made a particular mark.

### Step 1: Define the **P**roblem

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### Step 2: List **A**lternative Solutions

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### Step 3: List Important **C**riteria

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### Step 4: **E**valuate Alternative Solutions

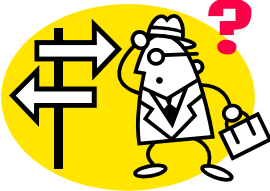
(Fill in the individual cells in the decision-making grid.)

### Step 5: Make a **D**ecision

(Which alternative do you think is the best solution?)

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# Decision-Making Grid



Name \_\_\_\_\_  
Class \_\_\_\_\_

| CRITERIA     |  |  |  |  |  |
|--------------|--|--|--|--|--|
| ALTERNATIVES |  |  |  |  |  |
|              |  |  |  |  |  |
|              |  |  |  |  |  |
|              |  |  |  |  |  |
|              |  |  |  |  |  |
|              |  |  |  |  |  |