



## TEACHER GUIDE

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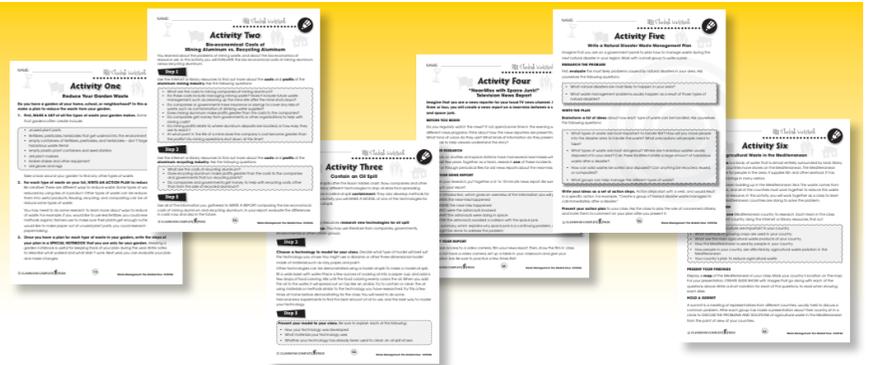
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# The Cost of Waste

1. Do you think it costs more money to make cans from aluminum that is mined from the earth, or from aluminum that is recycled from cans and other waste objects? Explain your reasoning.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. Explain the difference between activities that are SUSTAINABLE and activities that are UNSUSTAINABLE. You may use a dictionary to help you.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Match word to its meaning. You may use a dictionary to help you.

1	recycle	groups of people living near each other	A
2	industry	use the material from one object to make another object	B
3	generations	traveling for fun	C
4	communities	businesses related to making and selling goods	D
5	tourism	groups of people who are descended from people living today	E

# The Cost of Waste

What is bio-economics?

Long ago, people often moved into a new territory and quickly used up resources in an **unsustainable** way. They cut trees quickly and used up whole forests. They mined for gold and silver, and left large areas filled with waste. People made money, or **profits**, on the resources, but they did not create industries that would last for many generations. They also did not think about the cost of having to replant and repair habitats, and clean up waste. Now, people are beginning to understand that the money made on natural resources is only part of the picture. The way people take resources from the environment also ends up costing money.

**Bio-economics** is the study of both the costs and profits of natural resource use. Bio-economics uses both **biology**, the study of living things, and **economics**, the study of money. Bio-economics can help communities plan how to best use their resources. It can help answer questions like, "will we make more money cutting this forest and selling the timber, or using the forest for tourism and sustainable forest products, like nuts and medicines?"

**STOP** Describe the meaning of the term **bio-economics**.

\_\_\_\_\_

What are the bio-economical costs of waste?

Bio-economics has a huge effect on how communities handle their waste. In communities that have few resources, recycling and reusing is a way of life. Very little gets thrown away. But by the middle 1900s, many North American communities became wealthy. Most areas collected only trash, and buried everything in landfills.



Now, people have learned that the bio-economic costs of throwing away useful materials are too high. Activities like mining and cutting trees costs a lot of money in the long run. Recycling materials like plastics, paper, glass, and metals often costs less than getting new materials from nature. Now, many North American communities recycle most of their solid waste.



# The Cost of Waste

1. Use the words in the list to answer the questions.

economics	profits	biology	wealthy
landfills	bio-economics	resources	

- \_\_\_\_\_ a) What is the study of living things?
- \_\_\_\_\_ b) What are things in nature that people use to make products?
- \_\_\_\_\_ c) What is the study of money?
- \_\_\_\_\_ d) What is the study of both the costs and profits of natural resource use?
- \_\_\_\_\_ e) What is the name for money that is made in business?
- \_\_\_\_\_ f) What is the name of places where trash is buried?
- \_\_\_\_\_ g) What is the term for having a lot of money and resources?

2. People living in a rainforest are practicing bio-economics. Describe five things that the people might think about when deciding whether or not to cut an area of their forest.

1) \_\_\_\_\_  
2) \_\_\_\_\_  
3) \_\_\_\_\_  
4) \_\_\_\_\_  
5) \_\_\_\_\_

# The Cost of Waste

3. Explain why considering the bio-economical cost of an activity is smarter than considering only the profits of that activity.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4. Explain why recycling has a lower bio-economical cost than throwing away waste in a landfill.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Extension & Application

5. Evaluate the bio-economical costs of resource use at your home, school, or community. Possible topics include the bio-economical costs of:

- throwing away trash at your home or school
- energy use at your home or school
- land use in your city or town
- industries in your region

Write a topic of your choice and show it to your teacher before going forward.

Research any direct costs and profits associated with the resource use. Then, brainstorm a list of possible additional costs to the environment or human communities that the resource use might have over time. Think of alternative ways to use the resource that might lessen bio-economical costs.

On a large poster board, CREATE A 3-COLUMN CHART to display your bio-economical cost evaluation. The chart headings should be: **Bio-economical costs** (include direct and future costs), **Profits**, and **Lower Cost Alternatives**.



# Zero Waste School Plan

Write a plan to help your school to become a **zero waste** community.

## RESEARCH YOUR SCHOOL'S WASTE

TAKE A SURVEY of your school's waste. Walk around the school grounds, and visit each of the buildings. In each area, note the following:

- litter
- the main types of waste in trash bins
- the location of recycling bins, what materials can be collected in the bins, and whether they are being used

## WRITE YOUR ZERO WASTE PLAN

SUMMARIZE the main types of waste being thrown away at your school. Note any problems with certain kinds of waste becoming litter. Evaluate how well recycling programs are working.

BRAINSTORM a list of ideas about what students, teachers, and staff can do to help lessen the waste that is thrown away at school. Ask the following questions:

- How can people substitute reusable containers and items for disposable ones?
- What can be done to make sure all recyclable materials are placed in the correct recycling bins instead of in the trash?
- What can be done to lessen food waste?
- How can students reuse materials in the classroom?

Write your ideas as a set of ACTION STEPS. For example, "Assign students to help pick up litter in the cafeteria after lunch."

Present your zero waste school plan to students, teachers, and your principal.



# Word Search



Find all of the words in the Word Search. Words are written horizontally, vertically, diagonally, and some are even written backwards.

habitat	acid	fuel rods	hazardous
reduce	fertilizer	disposable	Exxon Valdez
nuclear	recycle	profits	biogas
mining	landfill	debris	industries
fungicide	cyanide	Chernobyl	atom
reuse	sustainable	Kovalam	toxic
uranium	space junk	economics	rock

A	D	S	D	F	G	H	J	K	L	R	Z	D	X	C	R	V	R
Z	S	F	E	R	T	I	L	I	Z	E	R	E	G	C	V	O	Q
A	D	U	A	A	Q	S	O	Q	A	D	A	B	Q	A	C	S	W
S	I	N	S	S	W	D	P	W	S	D	S	R	W	K	Q	P	E
D	S	G	S	T	E	F	U	E	D	C	D	I	E	C	W	A	R
F	P	I	D	D	A	G	R	R	R	E	U	S	E	H	E	C	T
G	O	C	F	F	R	I	A	L	F	Z	F	Q	T	E	R	E	Y
H	S	I	G	G	R	H	N	T	A	X	G	W	Y	R	T	J	U
J	A	D	H	P	E	C	I	A	G	N	H	E	U	N	Y	U	I
K	B	E	J	R	C	Y	U	I	B	C	D	R	I	O	U	N	O
I	L	A	K	O	Y	A	M	U	H	L	J	F	O	B	I	K	P
N	E	S	L	F	C	N	A	N	J	V	E	T	I	Y	O	Q	A
D	H	D	P	L	I	S	U	K	B	C	Y	P	L	P	W	S	
U	S	A	Q	L	E	D	D	C	L	T	O	M	A	S	L	E	D
S	D	F	E	S	Y	E	F	L	Q	T	N	U	I	D	A	R	F
T	F	G	M	U	J	G	E	W	N	O	I	S	N	B	T	G	
R	G	H	M	O	T	A	H	A	E	M	M	X	D	F	I	Y	H
I	H	J	E	H	C	A	J	R	R	O	I	O	I	G	O	N	J
E	J	K	R	I	I	K	T	I	T	P	C	P	F	C	G	U	G
S	K	L	D	K	O	V	A	L	A	M	S	Z	G	H	A	I	K
Z	L	H	A	Z	A	R	D	O	U	S	K	X	H	J	S	O	L
X	O	Z	T	J	O	L	X	F	U	E	L	R	O	D	S	P	Z
E	X	X	O	N	V	A	L	D	E	Z	L	C	I	K	S	L	X



# Comprehension Quiz

25

## Part A

Circle the word True if the statement is true. Circle the word False if it is false.

- 1) Corn stalks are an example of agricultural waste.  
True False
- 2) Hazardous mining waste can contaminate water supplies.  
True False
- 3) When oil is spilled from a tanker, it spreads out on the ocean floor.  
True False
- 4) High-level radioactive waste can remain harmful for thousands of years.  
True False
- 5) Solid waste from Hurricane Katrina is still a problem.  
True False
- 6) About 300 pieces of space junk can be found orbiting Earth.  
True False
- 7) Bio-economics is the study of how much money it costs to dispose of organic wastes.  
True False
- 8) Incinerators can cause air pollution.  
True False

## Part B

Put a check mark (✓) next to the answer that is most correct.

1. Which of these is high-level radioactive waste?  
 A uranium ore  
 B X-ray machines  
 C cancer medicines  
 D used fuel rods
2. Which of these substances are found in waste from metal mines?  
 A acids  
 B oil  
 C sewage  
 D fungicides
3. Which of these is an example of agricultural waste?  
 A cyanide  
 B acids  
 C fertilizer  
 D aluminum
4. Which facility will help a community practice zero waste?  
 A biogas  
 B incinerator  
 C landfill  
 D nuclear plant

# Waste from Asian Tsunami (Indonesia 2004)



NAME: \_\_\_\_\_

After You Read 



# The Cost of Waste



3. Explain why considering the bio-economical cost of an activity is smarter than considering only the profits of that activity.

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4. Explain why recycling has a lower bio-economical cost than throwing away waste in a landfill.

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3.

Considering profits only looks at the short-term. In the long-term an activity can have a lot more costs.

Answers will vary

11

4.

When waste is thrown away, new materials must be mined or cut to make new products. Making new products from recycled materials by recycling has a much lower cost to the environment.

Answers will vary

12

5.

Answers will vary

Answers will vary

13

Answers will vary

10

14



# EASY MARKING ANSWER KEY