Buried, Not Gone

Compare what different wastes leave behind in landfills.

ENV.2.3 "Compare and contrast biodegradable and nonbiodegradable wastes and their significance in landfills."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline two statements about how biodegradable waste changes in a landfill, and circle two statements about how nonbiodegradable waste changes. Put a 1 beside one problem both kinds of waste can cause.

What Happens Beneath the Trash?

1. After a school game, a trash bag holds apple cores, paper napkins, plastic wrappers, and glass bottles. If the bag goes to a landfill, its contents do not all behave alike. Apple cores and uncoated paper napkins are biodegradable: microorganisms can break them into simpler substances. Conventional plastic wrappers and glass bottles are nonbiodegradable on the timescale of a landfill. Glass may break into smaller pieces, and plastic may fragment, but neither change is the same as being consumed by microorganisms. Both kinds of waste take up landfill space, even though the materials change at different rates.

2. Landfills compress trash and cover it with soil or other material. Deep inside, oxygen is scarce, so microorganisms often break down food and paper without oxygen. This process can release methane, a powerful greenhouse gas. Some engineered landfills collect methane for energy or burn it to reduce its climate impact, but collection does not capture every bit. Buried food and paper can also decompose slowly because conditions vary within a landfill. Conventional plastic wrappers and glass bottles do not release methane through biological decay there, yet they can remain in the ground for many years. Their persistence creates a different long-term burden.

3. Rainwater that passes through trash can become leachate, a liquid that may carry dissolved pollutants. Both biodegradable and nonbiodegradable waste can contribute to a landfill's need for water protection, although the pollutants depend on what is buried. Landfills use liners and leachate collection systems to limit contamination. Keeping food scraps out of a landfill through composting can reduce the material available to produce methane, if the compost is managed with enough air. Reusing a glass bottle or reducing plastic packaging avoids adding persistent items. These choices address different problems, but neither makes safe landfill design unnecessary.

2 ANSWER WITH EVIDENCE

Use the passage

1. How does an apple core change differently from a plastic wrapper in a landfill? Explain why plastic fragmentation does not make the wrapper biodegradable.

2. Compare how buried food and paper affect methane production with how conventional plastic wrappers and glass bottles affect it.

3. How do both kinds of waste affect landfill space, and how do their rates of change differ?

4. How do composting food scraps and reusing glass bottles address different landfill problems?

3 YOUR TURN

Your own words

Choose one biodegradable item and one nonbiodegradable item not named in the passage. In four sentences, compare what could happen to them in a landfill and propose a different way to handle each, explaining how each choice addresses a landfill problem.

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PART 1 · READ AND MARK

Underline two statements about how biodegradable waste changes in a landfill, and circle two statements about how nonbiodegradable waste changes. Put a 1 beside one problem both kinds of waste can cause. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How does an apple core change differently from a plastic wrapper in a landfill? Explain why plastic fragmentation does not make the wrapper biodegradable.	**Microorganisms can break down an apple core. A plastic wrapper may fragment, but breaking into pieces is not the same as being consumed by microorganisms.**
2	Compare how buried food and paper affect methane production with how conventional plastic wrappers and glass bottles affect it.	**When microorganisms break down food and paper without oxygen, they can release methane. Conventional plastic wrappers and glass bottles do not release methane through biological decay in the landfill.**
3	How do both kinds of waste affect landfill space, and how do their rates of change differ?	**Both take up landfill space. Biodegradable waste can break down, sometimes slowly, while nonbiodegradable wrappers and bottles can remain for many years.**
4	How do composting food scraps and reusing glass bottles address different landfill problems?	**Composting food scraps with enough air keeps material that could produce methane out of landfills. Reusing glass bottles avoids adding persistent items.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A banana peel is biodegradable, while an aluminum can is nonbiodegradable. Buried without oxygen, the peel could release methane as it decomposes, but the can would persist rather than decay biologically. I would compost the peel with enough air to reduce the material that could produce landfill methane. I would recycle the can to avoid placing a persistent item in the landfill.

Accept other correctly classified items not named in the passage. The four-sentence response should compare their landfill fates and connect each proposed choice to a relevant landfill problem.