Smaller Footprints

Weigh the benefits and limits of greener buildings

GHW.12.3 "Evaluate the emerging trends toward reducing environmental footprints."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each proposed change that could reduce an environmental footprint. Circle a limit or condition for each change, then number the changes from most to least convincing based on the evidence in the passage.

Three Choices Across One City

1. In a northern city, a housing cooperative plans to replace failing gas furnaces with electric heat pumps. A heat pump moves heat instead of making it by burning fuel, so it can warm rooms using less energy than an electric resistance heater. On a grid with a growing share of wind power, the switch can cut pollution from heating. But a heat pump does not erase a building's footprint. Leaky windows make it work harder, manufacturing the equipment uses materials, and electricity may still come from fossil fuels. Insulating the building first can lower the energy needed every winter.

2. Across town, a developer considers tearing down an empty warehouse to build offices. Another option is to keep its sound steel frame and convert the space. Reusing the frame avoids producing some new steel and concrete, whose manufacture creates substantial greenhouse gas emissions. Yet saving the frame is not automatically the best choice. If the converted offices waste energy through thin walls for decades, those operating emissions could outweigh some construction savings. The developer would need to compare the materials saved with the energy used over the building's life, and plan insulation without compromising safety.

3. Meanwhile, a school district wants solar panels over a parking lot. The panels would generate electricity on sunny days and shade parked cars. Their output falls at night and in cloudy weather, so the district would still need power from the grid or stored electricity. Making and installing panels also requires materials and energy. The district could compare expected lifetime electricity production with those costs rather than calling solar power impact-free. These choices point to a wider trend: cutting a footprint means measuring both the resources used to make a solution and the pollution it prevents over time.

2 ANSWER WITH EVIDENCE

Use the passage

1. Why might the cooperative insulate its building before installing heat pumps? Explain how that order could affect the plan's footprint.

2. The developer calls reusing the warehouse frame the greener choice. What evidence supports that claim, and what could weaken it?

3. A board member calls the parking-lot solar panels impact-free. Evaluate that claim using two details from the passage.

4. A committee ranks the three projects only by the pollution they prevent in their first year. Why could that method lead to a poor decision?

3 YOUR TURN

Your own words

A town can fund only one upgrade this year at its old community center: seal drafty windows, install a heat pump, or add solar panels. The building uses gas for heat and grid electricity. In 70 to 95 words, recommend one upgrade to do first, compare it with one other option, and explain a benefit and a limit or condition of your choice.

Smaller Footprints

PART 1 · READ AND MARK

Underline each proposed change that could reduce an environmental footprint. Circle a limit or condition for each change, then number the changes from most to least convincing based on the evidence in the passage. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Why might the cooperative insulate its building before installing heat pumps? Explain how that order could affect the plan's footprint.	**Insulation reduces the heat lost through the building, so the heat pumps would need less electricity each winter.**
2	The developer calls reusing the warehouse frame the greener choice. What evidence supports that claim, and what could weaken it?	**Reusing the frame avoids emissions from making some new steel and concrete. Poor insulation could cause decades of high energy use, offsetting some of those savings.**
3	A board member calls the parking-lot solar panels impact-free. Evaluate that claim using two details from the passage.	**The claim is inaccurate. Making and installing panels uses materials and energy, and the district still needs grid or stored power when panel output falls.**
4	A committee ranks the three projects only by the pollution they prevent in their first year. Why could that method lead to a poor decision?	**It overlooks materials and energy used to make each project and misses how its energy savings or operating emissions add up over its lifetime.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would seal the community center's drafty windows first. That would reduce the heat the building loses each winter, so its gas furnace would use less fuel. A heat pump could eventually replace gas heating, but installing it before fixing leaks could make it work harder and increase electricity use. Sealing windows will not eliminate emissions from gas, and the town should check whether the repair actually reduces fuel use. Next year, the town could consider a heat pump as the grid becomes cleaner.

Accept different first choices if students compare an alternative and support their recommendation with a plausible footprint benefit and a relevant limit or condition. For Part 1, rankings may differ if students justify them with passage evidence.