



Student Resource: What is Single Stream Recycling?

Single-stream (or no-sort) recycling is a system in which recyclables, such as paper, metals, plastics, and glass, are mixed together rather than being sorted by citizens before collection. In a single-stream recycling system, people don't need to separate their recyclables. Instead, all recyclables are collected in a single truck, and then are separated for reuse at a materials recovery facility (MRF). At a MRF, materials are separated using conveyor belts and multiple separation methods. Once the materials are separated, they are collected together and sold for reuse.



◆ Advantages

Single-stream recycling means there are fewer barriers to recycling for citizens. The hope is that since it takes less effort to recycle, more people will do it, and more materials will be collected. In Minneapolis, the switch to single-stream recycling led to a 29 percent increase in recycled materials within a few years.

Single-stream recycling also makes the collection of recyclable materials cheaper, easier, and safer. Recyclables can be collected in one single-compartment truck, which costs much less than multiple-compartment trucks. Collecting recyclables in a single compartment also makes the job easier and safer for materials collectors.

◆ Disadvantages

Single-stream recycling comes with a number of disadvantages as well. Since recyclables need to be sorted before they can be sold, the cost to process them is higher. It costs about \$3 more per ton to process recyclables in a single-stream system.



There's also a higher chance that recyclables will become contaminated. Contamination can happen when materials that can't be recycled get mixed in with those that can. This can slow down or stop sorting at MRFs. Broken glass and wet paper can also get mixed in with other recyclables. This can mean that the recycled materials are worth less when sold. It can even mean that some materials that would normally be recycled may end up in the landfill.

Sorting No-Sort Recycling

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◆ How It Works

MRFs use an elaborate mix of machinery to sort materials. Some of these machines are fairly basic and mechanical, while others use newer and more sophisticated. Materials are spread out on a conveyor belt, then moved through a series of machines, such as a cardboard screen, a fines screen (which sorts out materials less than 2 inches long), a newspaper screen, magnets, and optical sorters that can detect and remove different types of plastics, and various other sorters and balers.



Technologies like infrared sorters can be used to identify different kinds of plastic, image processing systems can sort materials based on color, and electromagnetic sensing technology can be used to eject metal objects from the main conveyor belt. At some point in most systems, people are also needed to remove unwanted objects by hand.

◆ How You Can Help

When a single-stream recycling system is running smoothly, it can mean saving more recyclables from the landfill and helping to keep recycling profitable. If you live in an area that uses single-stream recycling, you can help make this happen by closely following the recycling rules and guidelines put out by your local recycling center. Following these rules means recyclables will arrive at the MRF facility in the best possible state for sorting. Some simple rules to follow are making sure loose plastic bags and unrecyclable plastics stay out of the recycling bin, and making sure that your recyclables are rinsed and allowed to dry, since wet paper and cardboard can't be recycled.

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Student Worksheet:

In a single-stream recycling system, a series of machines is used to sort mixed recyclables into their correct categories. In this activity, you will work in teams and as a class to design a system to sort mixed recyclables (plastics, glass, steel cans, and paper) into their four categories.

1. Working in teams of 3 or 4, brainstorm ways to separate each type of recyclable from the mixed bin. You should feel free to get up and examine the different materials available. Your team is allowed to help run the system, acting as part of the machinery (students can pull materials on a conveyor belt, bump and agitate materials, etc.), but you cannot directly handle the recyclables. The paper recyclables are also required to remain dry.
2. As a team, choose your best ideas for separating each type of recyclable. Then combine these ideas together to create a full system for sorting the entire bin.
3. Sketch out your design and present your team's plans to the class.
4. The class will vote on the best ideas and create a new, final design.
5. A designated member of each team will work to build this system using the available materials.
6. The building team will test the system. Watch to see how the system works.
7. Discuss with the class what worked and what didn't. Brainstorm ways to improve the system and decide what changes should be made.
8. The building team will make the changes and test the improved system.
9. Discuss with the class what worked and what didn't. What changes helped improve the system? What changes didn't? If you were going to build a third version, what other changes would you make?

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