

Material Recovery Facility Virtual Tour

Teacher Guide



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Introduction

Introduction

Welcome to Region of Peel's virtual tour of our waste management facilities. This resource has been developed to support you as you lead your students through the waste process at the Peel Integrated Waste Management Facility and Peel Curing Pad. This guide will provide you with practical suggestions and ideas to support inquiry-based learning, as you explore every page of the virtual tour with your students. The suggested discussion questions and extension activities can be adapted to meet the Ontario curriculum expectations for grades 3 to 8. This tour covers topics such as proper recycling sorting, primary and secondary composting and how composting organic waste is a step toward a circular economy.

The virtual tour can be used as a stand-alone activity or can kick-start further exploration and learning.

Why a virtual tour?

We recycle items every day. These items get sorted and processed to make new items, such as an aluminum can be made into another aluminum can. But when thinking of our waste management system, we do not think of the processes within this system to recycle. The Material Recovery Facility Virtual tour was designed to highlight to individuals the importance of this system in the path to a circular economy. It is a tool that gives both teachers and students exclusive access to Peel's Integrated Waste Management Facility on a level not seen before with in-person tours. It also allows Peel teachers a platform to educate their students on waste management within our region to showcase what happens to their waste products after throwing them in the recycling bin.

Program Overview

Key Themes:

- Recycling Process, Waste Sorting, Circular Economy

Learning Goals:

At the end of the virtual tour, students will be able to:

- Identify the main stages of the recycling process.
- Explain the importance of recycling in the path to a circular economy.
- Identify what should go into the recycling bin.

Introduction

How to Use the Tour

There are two delivery methods for this tour:

Student self-exploration: Students can access and explore the tour on their own devices while using the provided handout as a guide.

Teacher-led: If there is access to a class smart board/projector screen, the teacher can facilitate the virtual tour, and use this guide and accompanying discussion questions to facilitate class-wide discussions.

Navigation

The virtual tour is easy to navigate. There are 18 tour stops and each stop can be navigated by using the left-hand panel of images. You can also navigate between stops by selecting the “past location” and “next location” buttons at the bottom of the screen. As you move between stops, a text box will pop-up summarizing the importance of that stage in the tour.



Each tour stop has clickable interactive icons to provide more information and photos.

Button	Purpose
	Additional information
	Video clips

You can use the computer mouse or trackpad to click and drag around each stop for a 360-degree panoramic view. You can also zoom in on areas of the tour for a closer look – simply scroll forward and backwards using your mouse or pinch your laptop trackpad. If you’re working from a touch screen, you can move by touching the arrows icons, dragging across the screen to move, and pinching out to zoom in.

Introduction

Option 1: Student self-exploration

(in-class or virtual learning)

In this option, students navigate through the Material Recovery Facility Virtual tour at their own pace and can use the accompanying handout to guide their learning. Each location may have multiple stages and each stage has a 360-degree view and students are encouraged to explore as much as they can. Each location has clickable interactive icons. These contain additional information, images, and videos.

Option 2: Teacher-led exploration

(on smartboard/screen)

In this option, the teacher leads the class through the virtual tour as a group while using a smart board, computer and projector, or online learning platform.

Below you will find a step-by-step guide for exploring the virtual tour as a group, including speaking notes, a summary of interactive points within the tour and suggested discussion questions.

Introduction—Aerial View

What happens at the Peel integrated Waste Management Facility?

This is an aerial view of the Peel Integrated Waste Management Facility. This Facility is located in Brampton and processes garbage, organics and recycling for the Region of Peel.



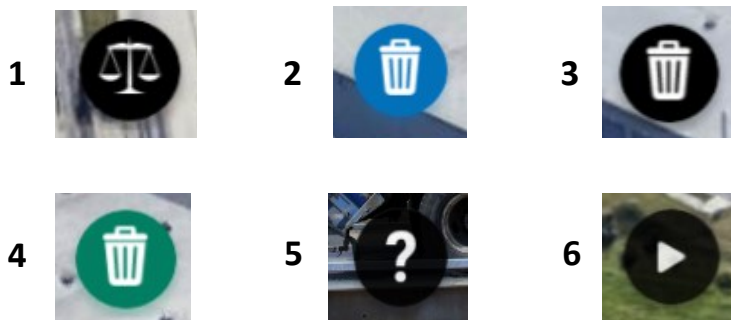
Discussion Questions

How does recycling save energy?

A lot of energy is extracted and processed when we create new products, including burning fossil fuels. However, using recycled materials reduces the need for raw materials which saves energy, money, and natural resources.

Navigation

There are six interactive icons to help students learn more about the Peel Integrated Waste Management Facility. The icons include text and a video.

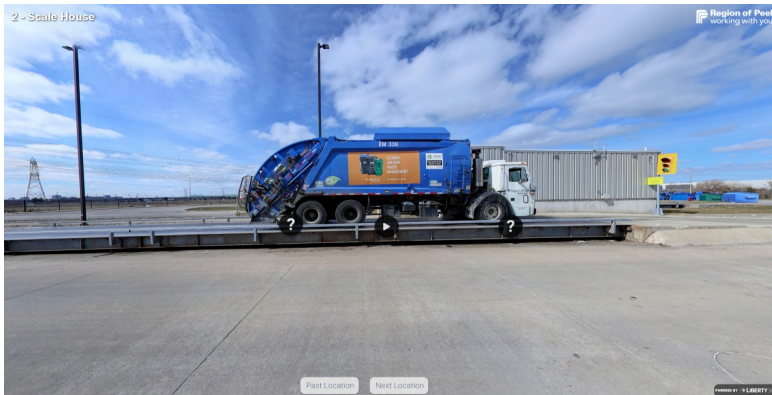


1. **Scale House:** Navigate to the interactive icon to see where the Scale House is located.
2. **Material Recovery Facility:** Navigate to the interactive icon to see where the Material Recovery Facility is located.
3. **Waste Transfer Station:** Navigate to the interactive icon to see where the Waste Transfer Station is located.
4. **Primary Composting Facility:** Navigate to the interactive icon to see where the Primary Composting Facility is located.
5. **The Integrated Waste Management Facility:** Select this icon to learn more about the cost and space used for the facility.
6. **Video:** Select this video to see a 360° view of the facility.

Scale House

What happens at the Scale House?

When collection trucks arrive at the Facility they first go to the Scale House to be weighed. Trucks drive onto a scale then can head to their respective area to drop off waste, in this case the Material Recovery Facility.



Discussion Questions

How many waste collection trucks do you think arrive daily at our facility?

- A) 50
- B) 70
- C) 80

There are roughly 80 trucks that arrive at the Peel Integrated Waste Facility daily.*

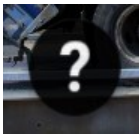
What are the benefits of weighing our waste at the Facility?

By weighing the amount of waste produced can help identify the quantity of waste collected and how to manage it.

Navigation

There are three interactive icons to help students learn more about the Scale House. The icons include text and an accompanying video.

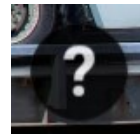
1



2



3



1. **Collection Truck:** Navigate to the interactive icon to see the collection truck.
2. **Video:** Select this video to see the process of collection trucks driving and entering the Scale House.
3. **Scale House:** Select this icon to learn how much waste the collection trucks bring to the Scale House.

Material Recovery Facility Doors

What happens at the MRF Doors?

This is the entrance to the Material Recovery Facility (MRF). The MRF doors are the first stop for Recycling collection trucks after exiting the scale house. Collection trucks enter here to offload waste in the Facility.



Discussion Questions

What recyclable items might you find at the Material Recovery Facility?

Items vary from a selection of plastics, metals, cardboard, newspaper, and glass.

Companies have created plastic plants that live all year round to replace digging up natural plants. Debate the pros and cons of having plastic vs. real plants in the classroom. Which is better for the environment?

Real Plants: Removing them from an ecosystem can displace critters and a food source. Must be replaced often. Must be regularly watered and cared for.

Plastic Plants: Require extraction of resources. Do not break down quickly if thrown out.

Tip: Look for or organize plant swaps and community gardens in your area!

Navigation

There are three interactive icons to help students learn more about the MRF doors. The icons include text and accompanying videos.

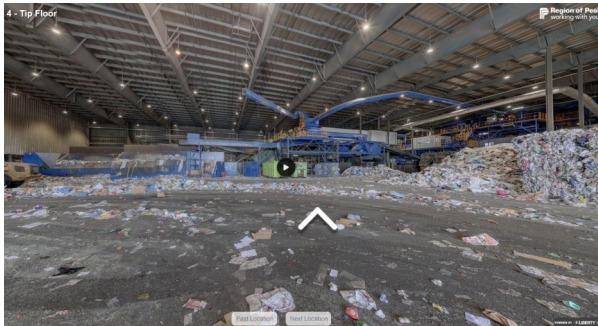


1. **MRF Doors (Left):** Select the icon to learn more about how much material the MRF processes.
2. **MRF Doors (Right):** Select the icon to learn more about the history of the MRF.
3. **Video:** Select the video icon to see what collection trucks do as they arrive at the MRF doors.

Tip Floor

What happens at the Tip Floor?

At the Tip Floor, trucks off-load recyclable materials they have collected from households in Peel. This is also the site where the operator of the front-end loader, the yellow machine, searches for contamination in the offloaded waste. Contamination is anything that is not accepted in Peel as recycling. After removing contamination, the material to be sent to the Pre-Sort Room is piled in preparation for transport on conveyors.



Navigation

There are four interactive icons to help students learn more about the Tip Floor. The icons include text and accompanying videos.



1. **Front-end Loader:** Select the icon to learn more about the front-end loader's role in identifying contamination on the Tip Floor.
2. **Video:** Select the video icon to see a truck offloading waste onto the Tip Floor.
3. **Bales:** Select the icon to learn more about how much material the Tip Floor receives.
4. **Video:** Select the video icon to see the front-end loader moving waste and inspecting for contamination.

Discussion Questions

Do you notice any items in the tour that do not look like they belong in Recycling?

Yes, some examples include plastic bottles with lids, a dodgeball, chip bags, foil, straws and many more.

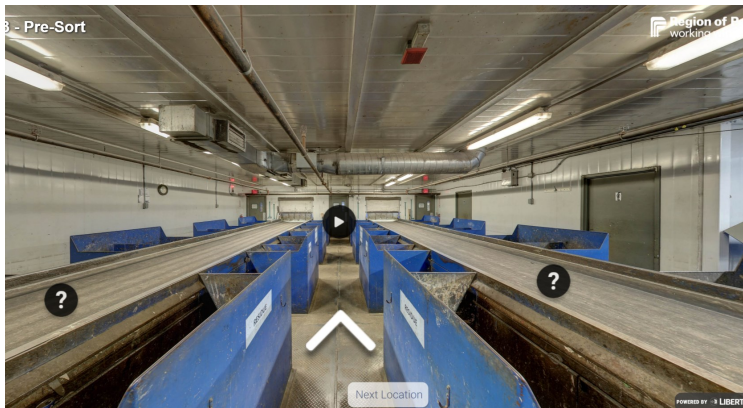
Extension Activities

Interested on what it takes to build a sustainable city? Check out [Recycle City](#) to see how citizens reduce waste, use less energy, and save money by doing small actions at home, work, and around their neighbourhoods.

Pre-Sort

What happens at Pre-Sort?

At the Pre-Sort room workers sort items moving on conveyor belts into different chutes. Workers remove large items and contamination from the conveyor. This ensures that large items do not enter the system and damage the MRF equipment. They also send bagged items to the bag breaker machine. The bags and their contents then feed back into the room through a different conveyor belt to be checked and sorted.



Discussion Questions

A lot of the work in this facility is done automatically by machines. However, as we've seen, there are also workers who manually check the waste for contamination. Why do you think we still manually sort for contamination?

It is important for workers to sort and remove any items that are missed by the machines because items that are not removed may cause a jam or damage the machinery during the processing stage.

Manufacturers use recycled products to create new materials. Can you think of waste items that could be repurposed in your home or at school before being thrown away?

Glass food jars and steel cans can be used as pencil holders, plant pots, musical instruments, or even for food – have you heard of mason jar salads, check out this neat trend: [How to Make a Mason Jar Salad](#)

Scrap paper can be used to line a compost bin

Old clothes can be turned into dish rags

Navigation

There are three interactive icons to help students learn more about the Pre-Sort Room. The icons include text and an accompanying video.



1. **Conveyor (Left):** Select this icon to learn about how workers sort items contained in plastic bags.
2. **Video:** Select this video icon to see the process of workers sorting items arriving in the Pre-Sort Room.
3. **Conveyor (Right):** Select this icon to learn about the specific items workers sort.

OCC Screens & OCC Quality Control

What happens at the OCC Screens and OCC Quality Control Room?

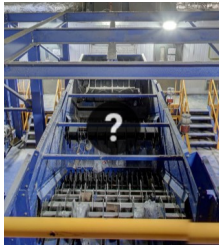
Items from the Pre-Sort Room come to the Old Corrugated Cardboard (OCC) Screens to become sorted further. The machines separate large 2D cardboard from other 2D cardboard and 3D containers. This process is done to make it easier for machinery to see items on the conveyor. The OCC Quality Control Room receives items from the OCC Screens and like the screens, workers remove large 2D cardboard.



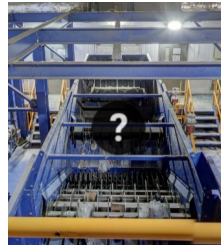
Navigation

There are two interactive icons to help students learn more about the OCC Screens and OCC Quality Control Room. The icons include text and accompanying videos.

1



2



1. **OCC Screens:** Select this icon to learn more about how the OCC Screens work.
2. **Video:** Select this icon to see how workers sort items in the OCC Quality Control Room.

Discussion Questions

These large machines work hard to separate large 2D cardboard from other 2D cardboard and 3D containers. Why do you think it is important that these machines to do so?

It is important for these large machines to remove large 2D cardboard, to help workers and the other recycling machines see the other items moving along the conveyors.

Extension Activities

One creative idea to help feed your local birds is to create a [recycled bird feeder](#) out of used milk cartons! Rather than tossing empty milk cartons in the Recycling, paint them, fill them with bird seeds, and wait for the birds to appear.

Scalping and Fines Screens

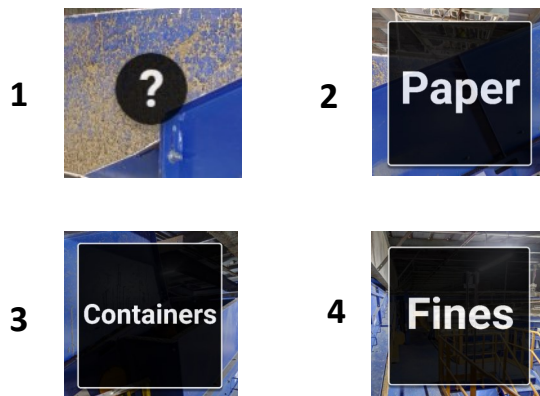
What happens at the Scalping and Fines Screens?

Items from the previous stage come to the Scalping and Fines Screens for continued separation of paper, containers and fines. The Scalping Screens are rapidly spinning disks where 2D paper is separated as it moves up and over these disks for paper processing. As well, 3D containers and course materials fall through to the Fines Screens through gravity. At the Fines Screens, 3D plastic and metal containers move up and over the screen to be sent for container processing while fines are broken on the Fines Screens for fines processing.



Navigation

There are five interactive icons to help students learn more about the Scalping and Fines Screens. The icons include text, a video and buttons to explore different pathways.



1. **Scalping Screens:** Select the icon to learn more about the Scalping and Fines Screens processes.
2. **Papers:** Select this button to go down the paper processing path.
3. **Containers:** Select this button to go down the containers processing path.
4. **Fines:** Select this button to go down the fines processing path.

Please note: Selecting the *Next Location* button will lead you to the Baling Stage. This stage happens after paper, containers and fines processing. Please click the respective buttons for each path before clicking Next Location.

Discussion Questions

Did you know that shredded paper is not recyclable?

It is important to sort our waste at home and at school correctly, to avoid machines breaking down, as well as material being incorrectly sorted. Shredded paper is just too small in size, it ends up contaminating the fines at the facility.

Throwing your garbage on the ground can harm animals, pollute water, and contaminate the air.

Do you think it is fair to fine people who litter? How much should it be?

Read about some littering policies and programs.

[People Against Littering | People Against Littering](#)

[Bill Godfrey at war against litter in Brampton | Brampton Focus](#)

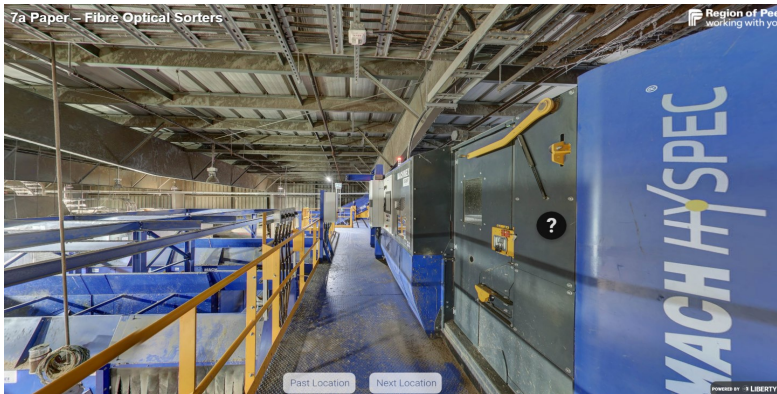
[Volunteer Litter Cleanup Program – City of Mississauga](#)

Do you think your school should have a littering policy? What are some things you would include in the policy to ensure your school grounds are litter free? Discuss your thoughts with the class to see what you come up with.

Paper: Fibre Optical Sorters

What happens at the Fibre Optical Sorters?

The Fibre Optical Sorters are apart of paper processing. Items from the Scalping Screens come here via conveyors. The Fibre Optical Sorter remove 3D containers that may have been missed by the screens. Optical Sorters rely on lights and sensors to produce images of the object passing through. The image is then used to determine if the item should be accepted or rejected, meaning whether it should follow the paper processing path or not.



Discussion Questions

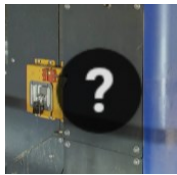
Now that we know that Fibre Optical Sorters are used to capture images of the items and determine if an item should be accepted or rejected. Where else might optical sorters be used?

Two examples where optical sorters might be found are in the mining industry to sort out minerals and metals, and also in the wine industry when sorting grapes by size, shape or colour.

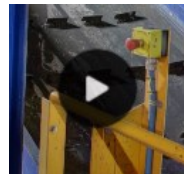
Navigation

There are two interactive icons to help students learn more about the Fibre Optical Sorters. The icons include text and an accompanying video.

1



2

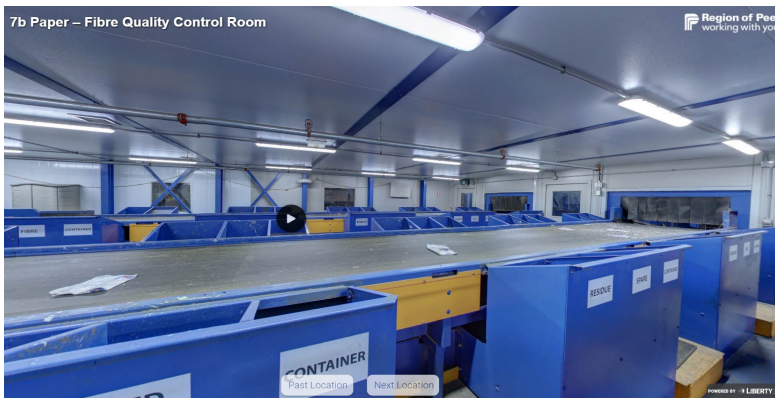


1. **Fibre Optical Sorter:** Select the icon to learn more about how Optical Sorters work.
2. **Video:** Select the video to see the sorting process inside the Optical Sorter.

Paper: Fibre Quality Control Room

What happens at the Fibre Quality Control Room

Items that are accepted at the Fibre Optical Sorter are sent to the Fibre Quality Control Room. In this room, workers will manually remove “contamination,” anything that is not paper. The removed items are sent down chutes to their respective processing pathways. Items that are accepted get sent to storage in preparation for baling. This is the end of the paper pathway.



Discussion Questions

After viewing the video of the Fibre Quality Control Room, you will notice workers placing non-paper items down chutes. What are the 4 different chutes of contamination found at this stage?

The 4 different streams found at the Fibre Quality Control Room include: Residue, Mixed Paper, Container, and Spare.

Navigation

There is one interactive icon to help students learn more about the Fibre Quality Control Room. The icon includes a video.

1

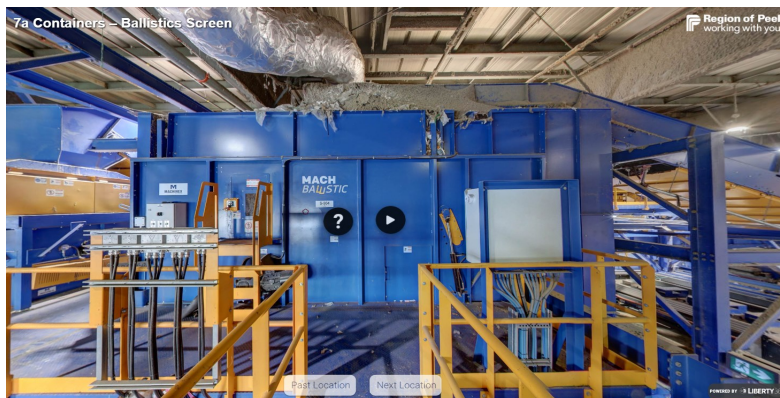


1. **Video:** Select this icon to watch workers sort in the Fibre Quality Control Room.

Containers: Ballistics Screen

What happens at the Ballistics Screen?

The Ballistics Screen is a part of Containers processing. The Double Deck Ballistics Screens work similarly to the Scalping Screens in which it sorts items based on dimension. The Ballistics Screen is angled and rapidly shakes. This action results in 2D items moving to one side while 3D items roll down the slope. Any 2D item, usually mixed paper, gets sent to the Mixed Paper Cleaning Optical Sorter. The 3D items move to the Overhead Magnet, while fines fall through holes to the Glass Recovery and Clean Up System.



Discussion Questions

What are some of the advantages or benefits of the Ballistic Separators?

Some of the benefits of the Ballistic Separators include:

- *More efficient*
- *Compact*
- *Easy to clean*
- *Low maintenance*
- *High-performing as there are no air parts to wear down materials*

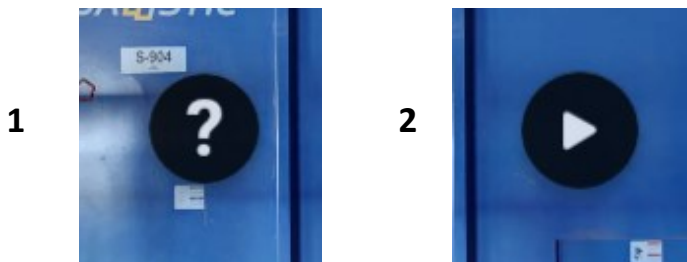
Would you consider going on a plastic diet? What are some things you can commit to not purchasing?

Some examples:

- Plastic water bottles – bring and use a reusable water bottle all the time
- Plastic saran wrap – put those snacks in a reusable food container, or wax liners
- Plastic Ziploc bags – this one is easy, just wrap your sandwich in a reusable container

Navigation

There are two interactive icons to help students learn more about the tunnels. The icons include text and an accompanying video.

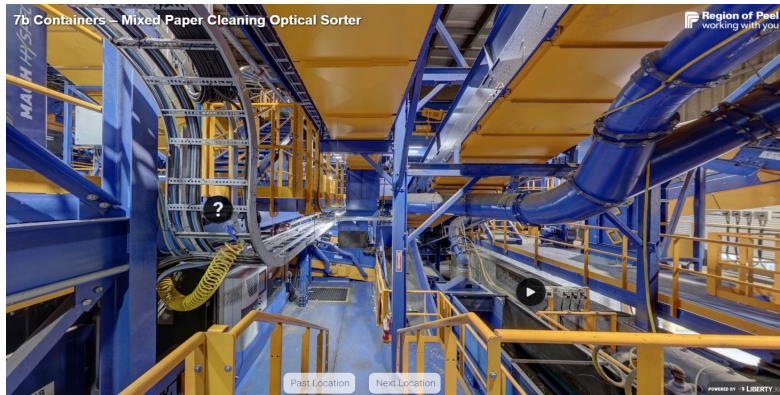


1. **Ballistics Screen:** Select this icon to learn more about how the Ballistics Screen works.
2. **Video:** Select the video icon to see inside the Ballistics Screen.

Containers: Mixed Paper Cleaning Optical Sorters

What happens at the Mixed Paper Cleaning Optical Sorters?

2D items on the Ballistics Screen get sent to the Mixed Paper Cleaning Optical Sorters. At this Optical Sorter, plastic and metal containers are sorted from mixed paper. Any containers found here are redirected back to the containers sorting process. There are also suction hoods that take in film to be sent to the film baler, the final stage for film. Any remaining paper gets sent back to the Fibre Quality Control Room.



Discussion Questions

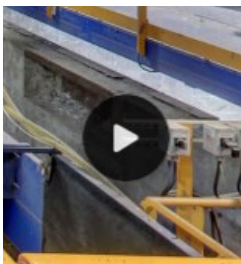
After reviewing the Mixed Paper Cleaning Optical Sorter, you have now learned that this machine sorts metal and plastic containers that have been incorrectly sorted from mixed paper. Why do you think these items are wrongly mixed with paper? Give examples of items.

These items could have been mistaken or mixed up with paper because of their size and colour which could imitate the features of paper.

Some examples include plastic storage lids or vinyl boxes.

Navigation

There are two interactive icons to help students learn more about the tunnels. The icons include text and an accompanying video.



Extension Activities

Curious on the importance of recycling properly? Watch this video [Recycle Right](#) created by the Region of Peel describing how the Region ensures materials are properly sorted.

1. **Video:** Select this video to see inside the Mixed Paper Optical Sorter.
2. **Mixed Paper Cleaning Optical Sorters:** Select this icon to learn more about what gets sorted during this stage.

Containers: Overhead Magnet and Steel Quality Control

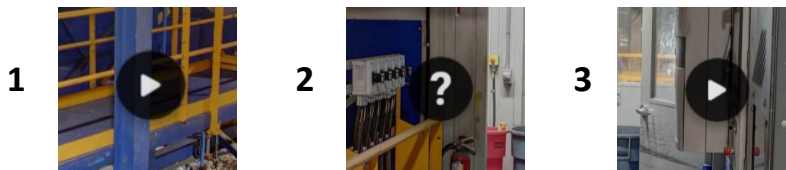
What happens at the Overhead Magnet and Steel Quality Control Room?

3D items from the Ballistics Screen are sent to the Overhead Magnet for further containers processing. Here, a magnet catches steel and magnetic items and sends them to the Steel Quality Control Room for workers to sort. Anything not captured by the magnetic gets sent to the Dual Eject Optical Sorter.



Navigation

There are three interactive icons to help students learn more about this stage. The icons include text and accompanying videos.



1. **Video:** Select the video to see the process of the Overhead Magnet.
2. **Steel Quality Control Room:** Select this icon to learn more about how workers sort in the Steel Quality Control Room.
3. **Video:** Select the video to see workers sorting in the Steel Quality Control Room.

Discussion Questions

What is the difference between ferrous and non-ferrous metals?

Ferrous metals are metals that contain iron and steel. Non-ferrous metals are metals that do not contain iron or iron components.

Describe the importance of having an Overhead magnet

The overhead magnet is a vital role when catching steel and magnetic items because they not only assist with sorting items containing iron and steel (ferrous), but they also protect other processing equipment from being damaged.

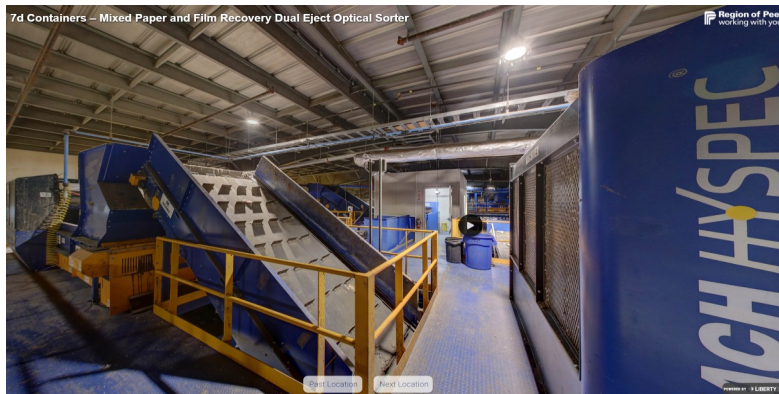
List one limitation when using magnetic separation in the Recycling industry?

One limitation is that magnetic separators must constantly be maintained, cleaned, or washed.

Containers: Mixed Paper and Film Recovery Dual Eject Optical Sorter

What happens at the Mixed Paper and Dual Eject Optical Sorter?

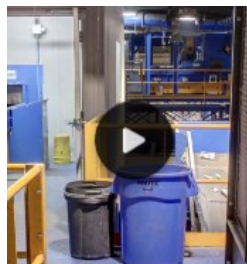
Items not captured by the Overhead Magnet are sent to the Film Recovery Dual Eject Optical Sorter. At this optical sorter mixed paper is ejected and sent to the Fibre Quality Control Room. Film is also ejected and sent to the film baler. Containers are then accepted via gravity and sent to the HDPE (High Density Polyethylene) Optical Sorter.



Navigation

There is one interactive icon to help students learn more about the mixed paper and Film Recovery Dual Eject Optical Sorter. The icon includes a video.

1



1. **Video:** Select this video to see how this Optical Sorter works.

Discussion Questions

Name the 3 directions items can undergo through this machine.

Items can go through this machine in 1 of the 3 directions.

1. *Mixed paper can be ejected onto a conveyor belt towards the Fibre Quality Control Room*
2. *Film items can be ejected down and moved to the Film baler.*
3. *Gravity allows any remaining containers to naturally fall to the next Optical Sorter.*

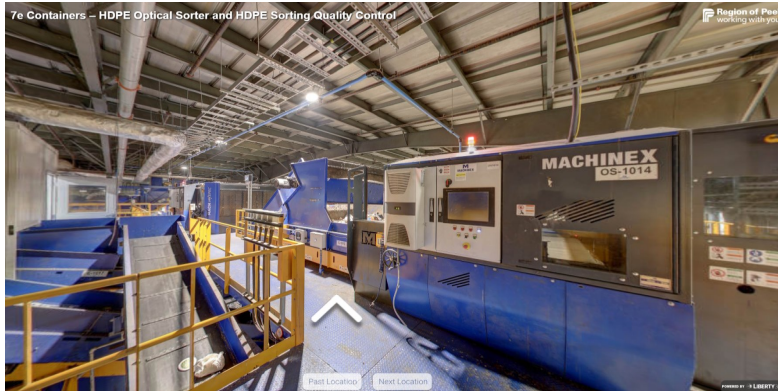
Do you notice anything interesting about the dual Eject Optical Sorter?

An interesting observation of the dual Eject Optical sorter is that it maximizes efficiency as it separates items into 3 streams.

Containers: HDPE Optical Sorter and HDPE Sorting/Quality Control

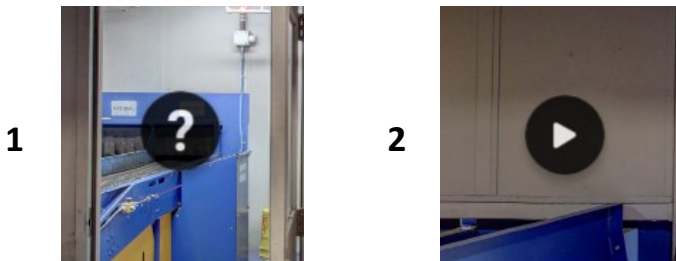
What happens at the HDPE Optical Sorter and HDPE Quality Control?

Containers that fell via gravity through the Dual Eject Optical Sorter are sent here. At the HDPE Optical Sorter, HDPE (High Density Polyethylene) plastics are ejected and sent to the HDPE Sorting and Quality Control Room. In this room, workers sort the HDPE plastics based on if they are coloured. Items that are accepted then head to the next stage in container processing.



Navigation

There are two interactive icons to help students learn more about the HDPE Optical Sorter and HDPE Sorting and Quality Control. The icons include text and a video.



1. **HDPE Quality Control Room:** Select this icon to learn more about sorting in the HDPE Quality Control Room.
2. **Video:** Select this video to see how workers sort in the HDPE Quality Control Room.

Discussion Questions

The HDPE Optical Sorter welcomes containers that fell via gravity and are sent to the HDPE Sorting and Quality Control Room for further sorting. Why do you think it is important that workers separate HDPE items based on colour?

It is valuable that workers separate HDPE items based on colour because the recycled produce is matched with its appropriate colour concentrate. It also prevents post-consumer resin (PCR), repurposed plastic, from coming to direct contact with packaged materials.

Extension Activities

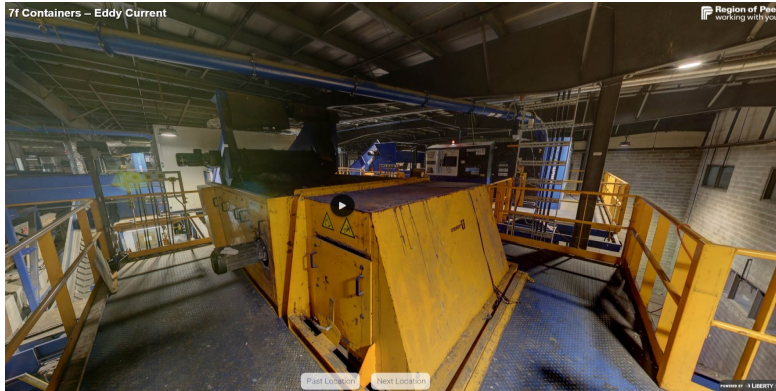
Brainstorm common HDPE items you might find at home or in the classroom that might lead to the HDPE Optical Sorter.

- Shampoo Bottles
- Toys
- Chemical Containers
- Pipe Systems
- Milk Jugs
- Recycling Bins
- Grocery Bags

Containers: Eddy Current

What happens at the Eddy Current?

Items that are accepted at the HDPE Optical Sorter get sent to the Eddy Current. At the Eddy Current, non magnetic metal, aluminum, gets ejected and is sent to Quality Control where workers remove any contamination.



Discussion Questions

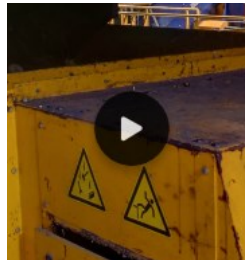
After watching the video of the Eddy Current, why wouldn't the same magnets from the Overhead Magnet be used for separating both aluminum and steel cans?

Magnets do not stick to aluminum or copper, nor to many other electrically conductive metals. However, the magnets inside the shell rotate past the aluminum at high speed which forms a magnetic field creating currents around the aluminum.

Navigation

There is one interactive icon to help students learn more about the Eddy Current. The icon includes a video.

1



1. **Video:** Select this icon to see how the Eddy Current works.

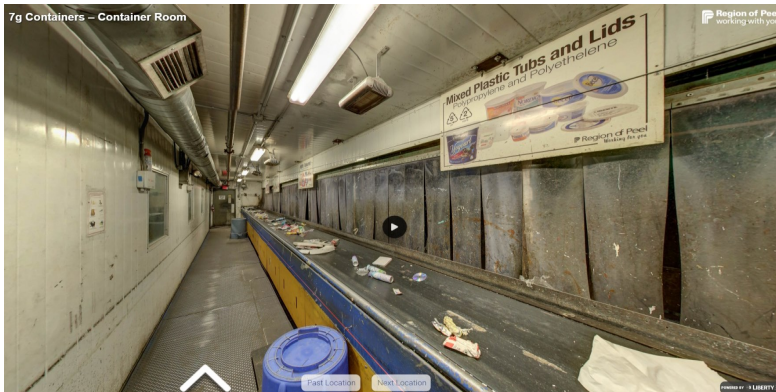
Extension Activities

Looking for a neat craft idea, check out: [How To Make Gorgeous DIY Tin Can Lanterns - DIY & Crafts \(diyncrafts.com\)](#) you can upcycle your tin cans and create something unique for gifts, or the garden.

Containers: Container Room

What happens at the Container Room?

Items still in the container pathway, accepted by the Eddy Current, are sent to the Container Room. At the Container Room workers remove any items not sorted by the eddy current and/or the optical sorters from the container pathway into their respective paths via chutes. Any items missed by the workers then go through a second eddy current then to the Recovery Optical Sorter Tower where any missed paper or containers are properly redirected.



Discussion Questions

Do you notice any remaining items that the equipment may have missed? List some examples.

Some examples of missed containers shown on the tour are cardboard, magazines, and black plastic pots.

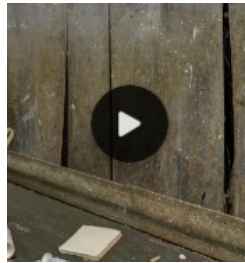
Extension Activities

Recycling paper, plastic, glass, and other items is crucial when making your home greener. Review these [Storage Project tips](#) to help sort, store, and transport all of these items.

Navigation

There is one interactive icon to help students learn more about the Container Room. The icon includes text.

1



1. **Conveyor:** Select this video to learn more about where items go that are missed.

Fines: Glass Recovery and Clean Up

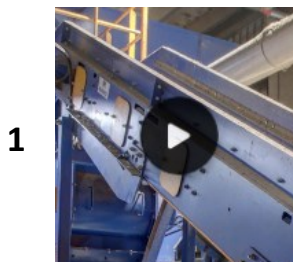
What happens at the Glass Recovery and Clean Up?

This is the beginning of the Fines Sorting Process. Here, items fall through fines screens to a double deck vibrating screen with an overhead magnet. The magnet will remove any magnetic items while the vibrating screen will separate glass less than 1 cm from larger glass residues. The small glass fines are sent to a storage container, or bunker, until they are sent to manufacturers to produce new glass.



Navigation

There are two interactive icons to help students learn more about Glass Recovery and Clean Up. The icons include text, images and accompanying videos.



1. **Video:** Select the video to see the recovery of fines.
2. **Glass Storage Container (Bunker):** Select the icon to see where glass fines are stored.

Please note: Selecting the *Next Location* button will bring you back to the Scalping and Fines Screens.

Discussion Questions

How might manufacturers create new products with used glass found at the glass storage container (bunker)?

Manufacturers can use recycled glass to manufacture several items, such as new bottles, jars, tiles, insulation products, or counter tops.

Extension Activities

Ever wonder what to do with a used candle jar once the wicks burns out? Here are [25 inventive ideas](#) to repurpose candle jars to prevent them from going to the landfill.

Glass bottles can definitely be recycled when you are finished using its contents. Try repurposing them in [19 resourceful and creative ways](#) in the comfort of your own home.

Storage Containers

What happens at the Storage Containers?

At the Storage Containers any items that have been processed and sorted wait here for baling. The following stages are not specific to the sorting pathway of a particular material as they occur to all fines, containers and paper.



Discussion Questions

Can you list some advantages why storing leftovers, lunches or any other food in appropriate containers are important?

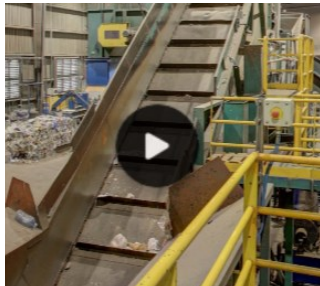
Some examples are:

- *Food storages keeps food fresh for a longer period*
- *Optimize storage space*
- *Avoid contamination from unwanted rodents or bugs*

Navigation

There is one interactive icon to help students learn more about the Storage Containers. The icon includes a video.

1



1. **Video:** Select this video icon to see items moving into storage containers.

Please note: *Storage Containers, Baler Infeed and Baling and Inventory are one stage in the virtual tour itself. However, they have been split up here for easy navigation.*

Baler Infeed

What happens at the Baler Infeed?

When the storage containers are full, their contents are transported to the baling machine. This machine will compress the items together into cubes called “bales”. There are two different baling machines that create different types of bales: the Harris bale and the Ambaco Bale.



Discussion Questions

What are the benefits of baling materials like cardboard, paper, plastic, and metals?

One of the benefits of baling these materials is that they can easily be stacked and transported for recycling. In addition, recyclables are removed from the waste stream and can be reused by a recycler or manufacturer.

Navigation

There are three interactive icons to help students learn more about the tunnels. The icons include text and accompanying videos.

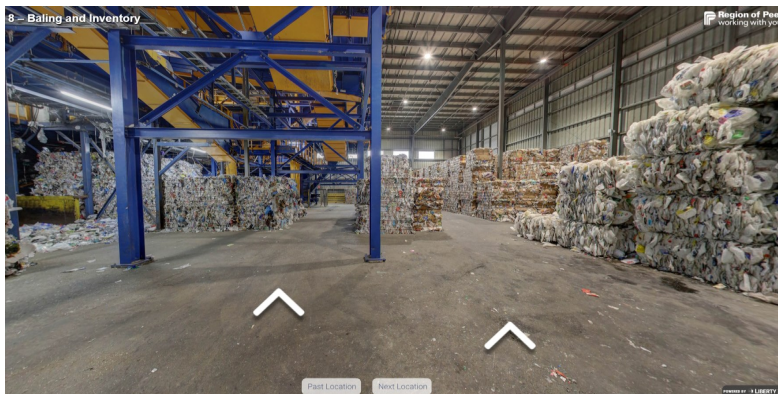


1. **Harris Baler:** Navigate to the interactive icon to see the Harris Baler.
2. **Ambaco Baler:** Navigate to the interactive icon to see the Ambaco Baler.
3. **Video:** Select this video to see the baling process.

Baling and Inventory

What happens at the Baling and Inventory?

After items have been baled, they are sent to the baling and inventory. Bales are wrapped in string called “bale wire” and stored here until they are ready to be sold.



Discussion Questions

What was the heavy bale found at the Baling and Inventory? What was the lightest?

The heaviest bale was the #8 News (Newspaper) bale where each bale weighs approximately 1076 kg. On the other hand, the lightest bale was the HDPE Natural Colour Bale where each bale weighs approximately 625 kg.

What was one thing you learned at the Material Recovery Facility?

Navigation

There are ten interactive icons to help students learn more about the bales. The icons include text, images and accompanying videos.



1. **HDPE Natural Colour Bale:** Select this icon to learn more about this bale.
2. **PET Bale:** Select this icon to learn more about this bale.
3. **Mixed Rigid Plastics Bale:** Select this icon to learn more about this bale.
4. **Film Bale:** Select this icon to learn more about this bale.
5. **Steel Bale:** Select this icon to learn more about this bale.
6. **HDPE Coloured Bale:** Select this icon to learn more about this bale.
7. **Cardboard Bale:** Select this icon to learn more about this bale.
8. **Mixed Paper Bale:** Select this icon to learn more about this bale.
9. **Video:** Select this video to see how bales are sent out of the inventory area.
10. **8 News Bale:** Select this icon to learn more about this bale.

Appendix A: Curriculum Connections

Grade 6

Subject & Unit	Specific Expectations
Social Studies: People and Environments	<p>Explain why some environmental issues are of international importance and require the participation of other regions of the world, along with that of Canada, if they are to be effectively addressed (e.g. disposal of electronic waste) Sample question: “Why can the disposal of your old computer be an environmental issue of international importance?”</p> <p>Describe some ways in which Canada’s interactions with other regions of the world have affected the environment</p>

Grade 7

Subject & Unit	Specific Expectations
Geography: Natural Resources around the World	Describe some responses to social and/or environmental challenges arising from the use of natural resources
Science and Technology: Earth and Space Systems	Identify common sources of greenhouse gases (e.g., carbon dioxide comes from plant and animal respiration and the burning of fossil fuels; methane comes from wetlands, grazing livestock, termites, fossil fuel extraction, and landfills; nitrous oxide comes from soils and nitrogen fertilizers), and describe ways of reducing emissions of these gases
Science and Technology: Understanding Life Systems	Describe how matter is cycled within the environment and explain how it promotes sustainability
Science and Technology: Understanding Matter and Energy	<p>Investigate processes (e.g., filtration, distillation, settling, magnetism) used for separating different mixtures</p> <p>Describe the processes (e.g., evaporation, sifting, filtration, distillation, magnetism) used to separate mixtures or solutions into their components, and identify some industrial applications of these processes</p>

Grade 8

Subject & Unit	Specific Expectations
Geography: Global Settlement	Describe possible features of a sustainable community in the future (e.g.. programs for waste and water recycling), and analyse some challenges associated with creating such a community (e.g., cost, population growth, increasing urbanization, continued dependence on fossil fuels)

Appendix A: Curriculum Connections

Grade 8

Subject & Unit	Specific Expectations
Science and Technology: Understanding Structures and Mechanisms	<p>Assess the personal, social, and/or environmental impacts of a system, and evaluate improvements to a system and/or alternative ways of meeting the same needs</p> <p>Assess the social, economic, and environmental impacts of automating systems</p> <p>Identify social factors that influence the evolution of a system (e.g., growing concern over the amount of waste creates a need for recycling centres, and the recycling centres must grow as population and waste increase...)</p>

Grade 9

Subject & Unit	Specific Expectations
Technological Education: Technology, the Environment, and Society	<p>Describe how various technologies (e.g... resource extraction) affect the environment, and identify important environmental considerations associated with different areas of technology (e.g., how to deal with hazardous wastes; how to increase opportunities for recycling, conservation, use of sustainable methods or materials)</p> <p>Identify technological solutions that have been designed in response to environmental concerns (e.g. non-toxic and hypoallergenic products, recyclable and reusable packaging)</p> <p>Follow proper procedures for the safe storage and disposal of materials and waste products (e.g., keep flammable solvents, paints, and varnishes in non-combustible cabinets; recycle used motor oil).</p>

Grade 10

Subject & Unit	Specific Expectations
Technological Education: Industry Practices, the Environment, and Society	Describe and apply appropriate conservation measures (e.g., reduce, reuse, recycle)
Technological Education Technology, The Environment, and Society	Explain the importance of “reduce, reuse, and recycle” and life cycle assessment (LCA) when designing, manufacturing, and marketing a product.

Appendix A: Curriculum Connections

Grade 10

Subject & Unit	Specific Expectations
Technological Education: Technology, The Environment, and Society	<p>Explain the need for environmental stewardship and describe how the manufacturing industry can act in an environmentally responsible way (e.g., by harvesting raw materials in a sustainable manner, using energy from renewable sources, making products that can be recycled, ensuring ethical treatment of people affected by manufacturing activities)</p> <p>Research and report on ways in which the transportation industry affects the environment and on efforts being made to remedy or reduce harmful effects (e.g., automotive parts recycling), including ways of disposing of waste products (e.g., used oil, used batteries, used paint/thinners)</p> <p>Describe the pros and cons of using environmentally friendly products (e.g., biodegradable cleaners) and procedures (e.g., recycling of materials) when servicing and/or maintaining vehicles and/or craft</p>

Grade 11

Subject & Unit	Specific Expectations
Technological Education: Industry Practices, the Environment, and Society	<p>Describe environmentally friendly disposal procedures for waste food products and food packaging (e.g., composting, recycling)</p> <p>Create a plan to implement an environmentally friendly disposal procedure for waste food products and/or food packaging (e.g., a plan to set up a composting or recycling program in the school cafeteria, a plan to encourage the use of biodegradable containers for take-out food)</p>

Grade 12

Subject & Unit	Specific Expectations
Technological Education: Industry Practices, the Environment, and Society	<p>Analyse the environmental costs and benefits, local and global, of recent innovations in communications technology (e.g., costs and benefits related to resource usage, energy demand, waste disposal, toxic substances, radiation, air and water pollution)</p> <p>Describe ways of minimizing or avoiding harmful environmental effects caused by communications technologies and media activities (e.g., upgrade products rather than dispose of them; turn off equipment that is not being used; treat dead batteries as toxic waste; recycle used paper and printer cartridges)</p>

Appendix A: Curriculum Connections

Grade 12

Subject & Unit	Specific Expectations
<p>Technological Education: Technology, The Environment, and Society</p>	<p>Identify potentially harmful consequences of manufacturing activities for the environment (e.g., waste disposal, greenhouse gas emissions, water and energy consumption, the depletion of non-renewable resources), and formulate alternatives to reduce the severity of these consequences</p> <p>Explain how the three Rs (reduce, reuse, recycle) can minimize the effect the manufacturing industry has on the environment</p> <p>Follow environmentally responsible practices during the design and manufacture of a product (e.g., minimize waste, consider using renewable or recyclable materials, design and manufacture products that last or can be repaired as opposed to throwaway products, use processes that have minimal impact on workers and the local environment)</p> <p>Demonstrate an understanding of the importance of using sustainable and environmentally friendly manufacturing practices</p> <p>Follow environmentally responsible practices during the design and manufacture of a product (e.g., minimize waste, consider using renewable or recyclable materials, design and manufacture products that last or can be repaired as opposed to throwaway products, use processes that have minimal impact on workers and the local environment)</p> <p>Demonstrate an understanding and application of the three Rs in a manufacturing facility (e.g., reduction of waste through efficient selection and conversion of materials, reuse of materials when possible, effective collection and recycling of materials and/or fluids)</p> <p>Demonstrate the use of proper techniques for the disposal of obsolete and/or waste products</p>

Student Handout

Material Recovery Facility Virtual Tour

Fill in the table below as you complete the Material Recovery Facility Virtual tour.

	Describe the importance of this stage to the Material Recovery process	What did you find interesting about this tour stop?
1. Introduction— Aerial View		
2. Scale House		
3. MRF Receiving Doors		
4. Tip Floor		
5. Pre Sort		
6. OCC Screens and OCC Quality Control		
7. Scalping and Fines Screens		
7a. Paper—Fibre Optical Sorters		
7b. Paper—Fibre Quality Control		
7a. Containers— Ballistics Screen		
7b. Containers— Mixed Paper Clean- ing Optical Sorters		

Student Handout

Material Recovery Facility Virtual Tour

Fill in the table below as you complete the Material Recovery Facility Virtual tour.

	Describe the importance of this stage to the Material Recovery process	What did you find interesting about this tour stop?
7c. Containers — Overhead Magnet and Steel Quality Control		
7d. Containers — Mixed Paper and Film Recovery Dual Eject Optical Sorter		
7e. Containers — HDPE Optical Sorter and HDPE Sorting/ Quality Control		
7f. Containers—Eddy Current		
7g. Containers— Container Room		
7a. Fines—Glass Recovery and Clean Up		
8. Storage Containers, Baling Infeed and Baling Inventory		

Student Handout—Answer Key

Material Recovery Facility Virtual Tour

	Describe the importance of this stage to the Material Recovery process	What did you find interesting about this tour stop?
1. Introduction—Aerial View	<ul style="list-style-type: none"> This stage is where garbage, organics and recycling is processed for the Region of Peel 	
2. Scale House	<ul style="list-style-type: none"> This stage portrays the location trucks go to weigh waste Weighing waste is important for metrics calculating how much waste is brought to the facility and landfill diversion 	
3. MRF Receiving Doors	<ul style="list-style-type: none"> This is entrance to the Material Recovery Facility (MRF). The MRF doors are the first stop for Recycling collection trucks after exiting the scale house. Collection trucks enter here to offload waste in the Facility 	
4. Tip Floor	<ul style="list-style-type: none"> This stage is where trucks offload organic waste onto the “Front-end Loader” This stage is important because it ensures that there is no contamination between objects The organics are later mixed with yard waste to balance the pile’s moisture levels 	
5. Pre Sort	<ul style="list-style-type: none"> This is where workers remove contamination and large items A machine rips open recycling bags 	
6. OCC Screens and OCC Quality Control	<ul style="list-style-type: none"> Large 2D paper, like cardboard, is separated from containers at this stage 	
7. Scalping and Fines Screens	<ul style="list-style-type: none"> Paper, containers, and fine items separate as they move through screens 	
7a. Paper—Fibre Optical Sorters	<ul style="list-style-type: none"> 3D items and garbage that fell through the screens are removed and sorted Optical sorters with lights and sensors are used to screen items 	

Student Handout—Answer Key

Material Recovery Facility Virtual Tour

Fill in the table below as you complete the Material Recovery Facility Virtual tour.

	Describe the importance of this stage to the Material Recovery process	What did you find interesting about this tour stop?
7b. Paper—Fibre Quality Control	<ul style="list-style-type: none"> Workers remove non-paper items so paper can continue to be bailed 	
7c. Containers—Overhead Magnet and Steel Quality Control	<ul style="list-style-type: none"> Steel and ferrous metals are pulled by the overhead magnet to separate containers by material 	
7d. Containers—Mixed Paper and Film Recovery Dual Eject Optical Sorter	<ul style="list-style-type: none"> Mixed papers, films like plastic bags, and remaining containers are sorted 	
7e. Containers—HDPE Optical Sorter and HDPE Sorting/Quality Control	<ul style="list-style-type: none"> At this stage, an optical sorter sorts plastic by colour White plastic is sorted from multicoloured plastic when bailed 	
7f. Containers—Eddy Current	<ul style="list-style-type: none"> Non-magnetic metals are ejected to separate from plastic containers 	
7g. Containers—Container Room	<ul style="list-style-type: none"> Workers manually sort different types of plastic 	
7a. Fines—Glass Recovery and Clean Up	<ul style="list-style-type: none"> Glass is separated by size at this stage 	
8. Storage Containers, Baling Infeed and Baling Inventory	<ul style="list-style-type: none"> At this stage, recyclable items that have been sorted are made into cubes called bales Bales are wrapped to be secure then sold to market for manufacturers 	