



# Lesson Plan: Recycle, Grade 4 Science and Technology

## Activity

Minerals in your home and school.

## Introduction

Many items around you at home and at school are made from mineral resources. If an item can't be grown, it must be mined! **Mineral resources** (including **metallic minerals** like gold, silver and nickel, and **non-metallic minerals** like sand, gravel, and gypsum) are made from natural earth materials in the ground and are non-renewable. **Non-renewable resources** cannot be easily regrown and replaced. It is important that we manage these resources responsibly. We can conserve mineral resources by properly recycling products so that they can be made into other useful goods. In this lesson, students will explore mineral resources and make connections to how these resources are used to create many of the items they use every day. Students will also consider the social and environmental impacts resulting from the mining and refining of these resources and identify ways that communities can reduce the need for extracting new mineral resources.

## Curriculum Connections

Science and Technology, 2022 (revised) and Social Studies, 2018 (revised)

### Grade 4

- Strand A: STEM Skills and Connections
- Strand C: Matter and Energy

## Learning Objectives

1. Identify where Recycle falls within the Region's Waste Hierarchy
2. Define and explain natural resources (including renewable resources and non-renewable resources), mineral resources, circular economy, and recycling
3. Work as a team to assess the social and environmental impacts of extracting and refining mineral resources
4. Examine and explain what happens to blue box materials once they leave the curb

## Resources Provided

- Worksheet:
  - Minerals in your home and school
- Videos:
  - Durham Region's Material Recovery Facility
  - Durham Region's five "Rs"
  - The Circular Economy

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## Activity Instructions

1. As a class, discuss the term **natural resource** (including **renewable** and **non-renewable resources**) and ask the students to list some items made from natural resources in the classroom. Which of the items are renewable, and which of the items are non-renewable?
2. Introduce the students to **mineral resources**.

Mineral resources are made from natural earth materials in the ground and are non-renewable, meaning they can not be easily regrown and replaced. These materials must be mined to be used by people. Some of these resources can be used with only small amounts of additional processing, others need to be further processed or refined for our intended use. Can your students pick out any items in their schools or homes that are made from mineral resources? Use the items below to guide the conversation.

- Walls – most of the walls in our homes and schools are made of drywall, which is made from the mineral gypsum. Gypsum is solid but also soft, which means we can still drill into it to hang pictures or shelving.
  - Windows – window glass is made of sand which is mostly grains of the mineral quartz. Quartz is very hard and clear. This means we can see through the windows in our homes and school while being protected from the outside elements.
  - Concrete – outdoor play pad areas and steps, and the foundations under our homes are often made of concrete. Concrete is made with sand, gravel, and lime from limestone.
  - Bricks – the outside of our schools and homes are often made from bricks. Bricks are made from clay minerals.
  - Steel – the legs and supports on our chairs, desks, and tables are often made of steel. Steel (iron + carbon + other elements) is a very strong metal alloy, meaning it is made up of two or more metals.
  - Porcelain – the toilets and sinks in our homes and schools are often made of porcelain, which is made from clay minerals.
  - Plastic - crude oil, natural gas, and coal are refined to make plastic. These resources are all made mostly from carbon that comes from buried organic materials, like plants and animals. While these are not minerals, they all occur within sedimentary rocks and are therefore considered mineral resources.
3. It takes a lot of energy to extract, refine, manufacture, and transport these resources, and then to process or dispose of products when they are no longer needed or wanted. This system presents several potential social and environmental impacts. As a class, brainstorm and create a list of potential social and environmental impacts resulting from extracting and refining mineral resources.

A **social impact** is the effect (either positive or negative) on people and the community because of an action or inaction, an activity, project, program, or policy.

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An **environmental impact** is the effect (either positive or negative) on the natural environment because of an action or inaction, an activity, project, program, or policy.

4. Introduce conservation and the Region's five "Rs" to the class.

It is important that we do our best to **conserve** natural resources. This means protecting these resources from harm or destruction. Conserving natural resources helps to ensure we continue to have access to these resources in the future while limiting the negative social and environmental impacts associated with the extracting of new materials. We can conserve our mineral resources by using the Region's five "Rs" (Rethink, Reduce, Reuse, Recycle, and Recover). As a class, watch the Durham Region's five "Rs" video to learn more.

5. Introduce the fourth R to the class – Recycle.

Even after we've done our best Rethink, Reduce, and Reuse, we can still have materials left over that need to be managed. We can conserve mineral resources at the end of their lives by properly recycling products. **Recycling** is collecting and processing materials that would otherwise be disposed of as waste and turning them into new products. Recycling helps to retain value associated with the material for a longer period, reduces the amount of new natural resources required to make new materials, and supports a circular economy. Watch the Circular Economy video to learn more.

6. Check out the Durham Region's Material Recovery Facility video to learn more about what happens to our blue box materials in the Region.
7. Students will complete the provided Minerals in your home and school Worksheet for submission.

## Summary

Recycling is part of the circular economy, a closed looped system that aims to retain and recover as much value as possible from resources by rethinking, reducing, reusing, and recycling products and materials. Recycling helps to retain value associated with the material for a longer period, reduces the amount of new natural resources required to make new materials, and supports a circular economy.

## Expanded Curriculum Connections

Grade 4, Science and Technology, 2022 (revised)

### A: STEM Skills and Connections

#### A1. STEM Investigation and Communication Skills

- A1.1 use a scientific research process and associated skills to conduct investigations
- A1.5 communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes

### E. Earth and Space Systems

#### E1. Relating Science and Technology to Our Changing World

- E1.1 analyse ways in which geological processes impact society and the environment

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- E1.2 assess social and environmental impacts of extracting and refining rocks and minerals and of manufacturing, recycling, and disposing of products derived from rocks and minerals, while taking various perspectives into account