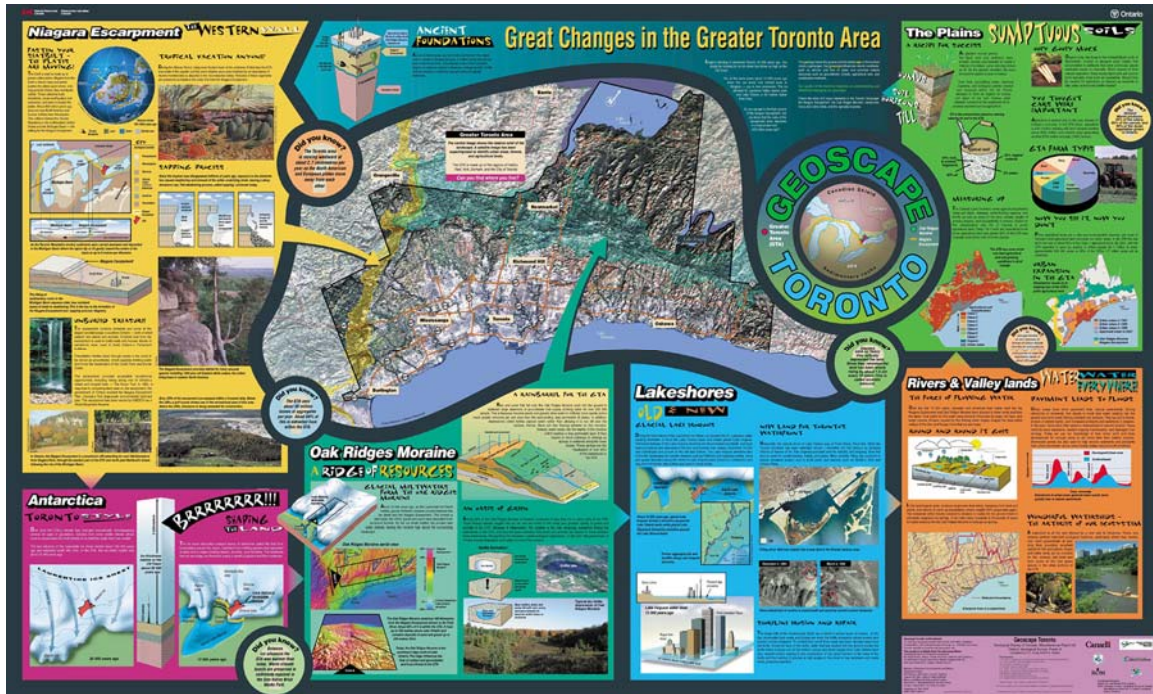


Aggregate Resources



Overview

This Geoscape lesson contains three activities that introduce students to the importance of aggregate. Students will take photographs of the use of aggregate in their neighbourhood and create a Web site or presentation to describe the importance of aggregate in everyday life. Technical language associated with the aggregate industry is introduced through an aggregate bingo game. Students will learn about different activities conducted by the aggregate industry, then team up to explore the problems, concerns and solutions associated with each activity. Students will also be tasked with rehabilitating a depleted aggregate site. They must work together to design the area according to guidelines that take into consideration environmental concerns and human needs.

At the end of the lesson, students will be able to:

- Explain the importance of aggregate to everyday life
- Understand the vocabulary associated with the Canadian aggregate industry
- Describe the problems, concerns and solutions associated with activities conducted by the aggregate industry
- Identify factors needed for land rehabilitation
- Create a simplified rehabilitation plan for a depleted aggregate operation

Specific Curriculum Expectations

Grade	Strand	Expectations
7	Geography Earth and Space Systems	<ul style="list-style-type: none">• demonstrate an understanding of the interaction theme• use appropriate vocabulary, including correct science and technology terminology, to communicate ideas, procedures, and results• identify the factors that must be considered in making informed decisions about land use• investigate some of the ways in which humans have altered the landscape to meet their needs• identify earth resources used by humans to manufacture products
9	Geography of Canada	<ul style="list-style-type: none">• analyze the ways in which natural systems interact with human systems and make predictions about the outcomes of these interactions• explain how human activities affect, or are affected by, the environment• evaluate solutions to environmental problems proposed by various groups and make recommendations for sustainable resource use

Duration

- 180 minutes

Lesson Instructions

Activity 1

- Introduce the term “aggregate” to the class. Aggregate is crushed stone, sand and gravel. “Stone” is a general term for rock that is used in construction. Aggregate is used by the construction industry to make concrete and build roads. Finely crushed aggregate is also used in plastics, glass, paint, wallboard, and roofing tiles. Aggregate of southern Ontario is one of the province’s most important natural resources.
- As a class, brainstorm a list of products created from aggregate. Use the **Teacher Information Sheet** *The Uses of Aggregate* to facilitate this discussion.
- Equipped with a digital camera, students venture into their neighbourhood to photograph the use of aggregate in their surroundings.
- Students use their research to build an educational Web site or presentation that describes the importance of aggregate in everyday life.

Activity 2

- Distribute copies of the **Worksheet** *Aggregate Bingo Cards* and bingo markers to each student.
- As a class, decide on the winning combination (full line in any direction, full card, etc.).
- Instruct students to cut out the vocabulary and glue the words randomly onto their blank cards.
- Read out the vocabulary word definition from the **Teacher Information Sheet** while the students try to find the word that matches on their cards. Confirm the word to ensure the correct square has been covered by the students.
- When students have all the boxes covered to fit the winning combination, they will yell “Aggregates!”
- As an introductory activity, it may be useful to provide students with the list of definitions outlined on the **Teacher Information Sheet** to help promote the memorization of this vocabulary.

Activity 3

- Distribute copies of the **Worksheet** *How Aggregate Gets to You*. This handout will provide background information on how aggregate is extracted and processed.
- Write the following categories in columns on the board: land, water, air, wildlife and people.
- After students have read the background information facilitate a brainstorming session about how the environment may be affected by the extraction and processing of aggregates. Invite students to record their answers under the appropriate headings.
- Distribute one *Teaming Up for Action Card* to each student. There are three types of cards:
 1. **Aggregate activity:** describes different activities conducted by the aggregate industry.
 2. **A concern:** discusses the environmental impact of a specific aggregate activity.
 3. **A possible solution:** one way that the aggregate industry has attempted to reduce its impact on the environment.
- Review the concepts covered on the *Teaming Up For Action* cards to ensure student comprehension and make sure each problem has a matching concern and solution.
- Instruct students with an *Aggregate Activity* card to try and find the two students with the matching "concern" and "solution" cards.
- Once the students find their matches, give the groups time to discuss their cards. Can they think of related concerns or possible solutions not listed on their cards?
- To summarize the activity, allow students to share their cards with the class.

Activity 4

- Divide the class into eight groups and distribute the **Information Bulletin** *Rehabilitating the Land* and the **Worksheets** *Existing Site Conditions* and *Rehabilitation Zones* which provide background information about rehabilitation, the site, and instructions to complete the activity.
- Use the **Overhead** *Existing Site Conditions* to explain the assignment to the students:

The overhead shows how the land is currently being used. In the future when aggregate extraction is complete the company will have to rehabilitate the area. Plans for rehabilitation are made before extraction takes place. The assignment is to return the land back to a productive state, keeping in mind habitat, human and wildlife needs. A fictional scenario should be described for students: Despite having established rehabilitation plans for the site, the company is looking for alternative rehabilitation ideas. Each group will be responsible for designing one section of the rehabilitation area according to specific guidelines. Students will create three-dimensional models of each section using art and craft materials, and present their plan to the class. Then, like a giant jigsaw puzzle, the class will put together the pieces rehabilitated site to complete the plan.

There are many different forms of land rehabilitation. Land can be returned to agriculture for arable or pastoral farming. Land may be use for recreation and leisure projects, including water and sports facilities, fishing lakes or parks. Sites have been used for water storage to create reservoirs. Nature conservation, often in conjunction with new leisure facilities, such as visitor centres and parking lots have been created to give managed public access to wildlife reserves. New housing may be part of a rehabilitation plan.

- As a class, discuss the features of the existing site. Decide what features on the poster will have to be removed during rehabilitation (facilities, buildings around the site, equipment and stock piles), and what features are permanent and will remain in the future area (communities, ponds, roads, vegetation).
- Overlay the **Overhead** *Rehabilitation Zones* on the map of existing site conditions to illustrate the location of each section requiring rehabilitation. Assign one zone per group.
- Using the **Information Bulletin** *Rehabilitating the Land*, instruct each group of students to build a three-dimensional model to represent their completely rehabilitated section.
- Students will then come together to build the entire rehabilitate site. Each group will first present their rehabilitation plan to their classmates and then add their zone to the rehabilitated area.

Materials Required

Download lesson materials from the Geoscape Toronto Web site at - www.toronto.geoscape.nrcan.gc.ca (PDF format)	Materials and equipment from the classroom
Activity 1	
Teacher Information Sheet <ul style="list-style-type: none"> <i>The Uses of Aggregate</i> 	<ul style="list-style-type: none"> Digital camera
Activity 2	
Teacher Information Sheet <ul style="list-style-type: none"> <i>Aggregate Bingo Definitions</i> Worksheets <ul style="list-style-type: none"> <i>Aggregate Bingo Cards</i> 	<ul style="list-style-type: none"> Markers to cover the squares Pens, pencils, scissors and glue
Activity 3	
Worksheet <ul style="list-style-type: none"> <i>How Aggregate Gets to You</i> Cards <ul style="list-style-type: none"> <i>Teaming Up for Action Cards</i> 	<ul style="list-style-type: none"> none
Activity 4	
Overheads <ul style="list-style-type: none"> <i>Existing Site Conditions</i> <i>Rehabilitation Zones</i> Information Bulletin (photocopy a class set) <ul style="list-style-type: none"> <i>Rehabilitating the Land</i> Worksheets (photocopy a class set) <ul style="list-style-type: none"> <i>Existing Site Conditions</i> <i>Rehabilitation Zones</i> 	<ul style="list-style-type: none"> Art and craft supplies for building a three-dimensional model of a landscape
Additional note to Teachers: <i>It is helpful to enlarge the site map and rehabilitation zones to use as a base for each model. This will ensure the models are all at the same scale when reassembling the landscape.</i>	

Glossary of Terms

New vocabulary in this lesson is explored in great detail during Activity One “**Aggregate Bingo**”. Please review the list of terms and definitions provided on the Teacher Information Sheet in this activity. Definitions are also provided in the **Glossary of Geologic Terms** found on the Geoscape Toronto Web site at www.toronto.geoscape.nrcan.gc.ca