



ELECTRIFYING

THE FUTURE



Welcome to the Electrifying the Future Educational Kit!

This comprehensive kit has been meticulously curated to offer students a captivating insight into the Mining and Automotive & Mobility Industries. Packed with engaging hands-on learning activities, this resource is designed as a valuable teaching guide for educators in the classroom.

This initiative stems from the generous funding received by The Goodman School of Mines at Laurentian University from the Ontario Vehicle Innovation Network (OVIN), a Ontario Center of Innovation (OCI) and Government of Ontario endeavor. OVIN's mission revolves around acquainting the public with diverse career opportunities in the Automotive & Mobility industry.

Electrifying the Future (ETF) aims to introduce today's youth to the vast array of prospects and professions available in the Mining and Automotive & Mobility sectors (from the Earth to the Automobile) through initiatives such as the MineOpportunity Competition, Summer Camps, and an Educational Campaign. The ETF project has already impacted approximately 900 students across Northern Ontario. These initiatives introduce essential skills and hands-on learning experiences that could potentially lead students towards future careers within these industries.

Visit electrifyingthefuture.ca for more information.

Lessons and materials contained within this kit include:

- Lesson 1 - Solar Powered Car Engineering:** Students delve into constructing a solar race car and racing the cars against each other, utilizing the items provided in the kit:
 - ☆ The Solar Car Kits
 - ☆ Rechargeable Flashlight
 - ☆ Deluxe Educational Solar Kits
 - ☆ Accompanying Lesson Plan 1
- Lesson 2 - Minecraft-Inspired Rock Identification Game:** Students explore rock and mineral identification and material properties relevant to everyday life worldwide. The necessary materials for this activity are:
 - ☆ Minecraft-Inspired Rock Identification Game and accompanying Lesson Plan 2
- Lesson 3 - Electrifying the Future: OVIN Career Navigator Tool:** Students gain insights into various career options in the Automotive and Mobility Industry through the exploration of the Career Navigator tool on OVIN's website.
 - ☆ Accompanying Lesson plan 3

We're thrilled to present this Educational Kit as a gateway to discovering the fascinating realms of the Mining and Automobile & Mobility industries. May it spark curiosity and inspire the next generation of innovators and professionals.

Sincere Regards,

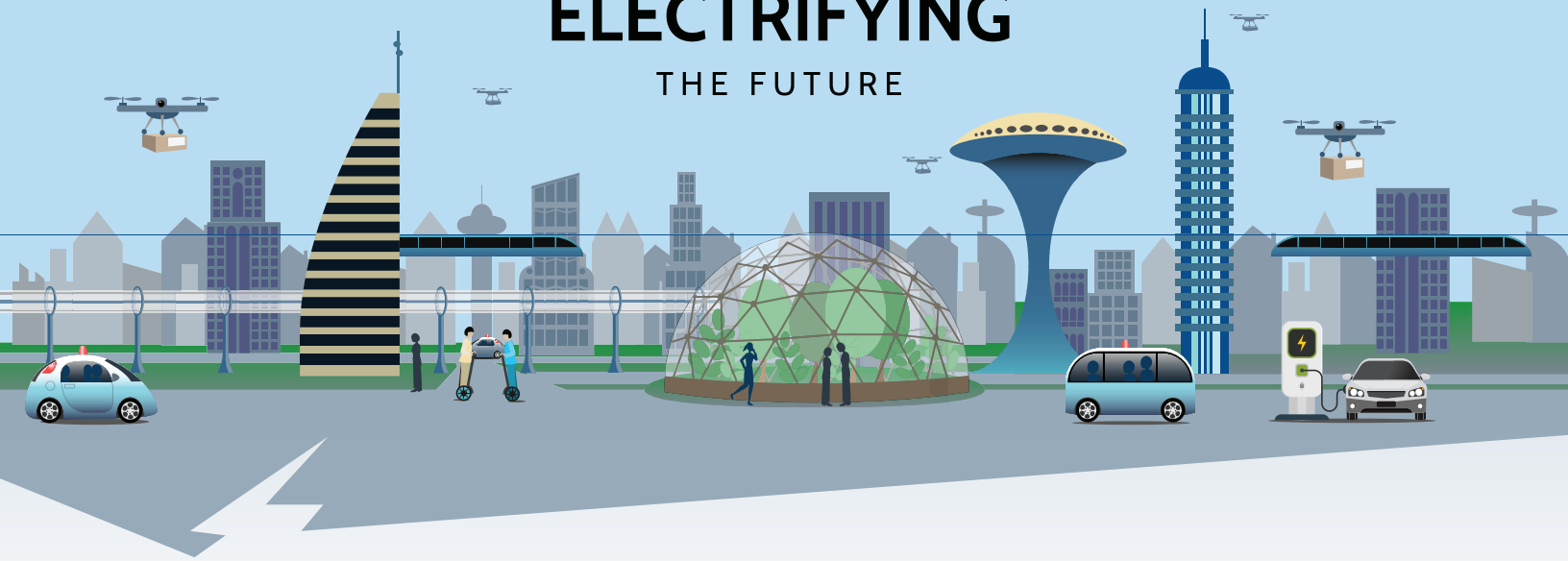
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Digital copies of
these documents can be
downloaded from:

 electrifyingthefuture.ca



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DESCRIPTION

This lesson focuses on the identification and material properties of rocks and minerals relevant to daily life for many people across the world. Two options are available, a geologist's search for minerals or a quiz show game that can be modified for various age groups. This lesson specifically fits into Ontario's grade 4, 5, and 12 science curriculum, but there may be alternative outcomes in the curriculum that may be fitting for this lesson.

For a demonstration of the activity, Cate Larsen @groovygeologist has provided a description on Instagram.

The video can be viewed through the QR code or by visiting: [instagram.com/reel/Co-1WxA-DeS3/?igshid=ZWl2YzEzYmMxYg==](https://www.instagram.com/reel/Co-1WxA-DeS3/?igshid=ZWl2YzEzYmMxYg==).



OBJECTIVES

- ☆ Students will learn and utilise terminology related to minerals and geological processes.
- ☆ Students will learn how to identify rocks and minerals found in *Minecraft*.
- ☆ Students will learn the physical properties of different rocks and minerals and their utility in daily life.



SITE/SPACE

- Generally, an indoor space with lots of natural light, or an outdoor space, will allow for better observation of rock and mineral specimens.
- Students can work in pairs to discover and discuss with one another the physical properties that they observe.
- In the quiz show option, a document viewer and projector would help verify the specimen the students are looking for.
- Magnets (fridge magnets suffice) and magnifying glasses would aid the observation, however are not included in the Minecraft-inspired rock ID games.



MATERIALS

- ✓ Minecraft-Inspired Rock Identification Game from Laurentian University
- ✓ Magnets (for the iron sample)
- ✓ Computer
- ✓ Projector



Please note that this first edition of the lesson may require some modification to better fit curricular objectives. It is possible for this lesson to be modified in a way to better suit students' capacity and fit a style of exploratory learning, but was not included in this lesson for logistical reasons.

Please modify this lesson where needed.

OUTCOMES: See end of document for Grade 4, 5, and 12 outcomes that may apply to this lesson.



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ACTIVITES

► Minecraft-Inspired Rock Identification - Becoming a Geologist

Time: 20-30 minutes

Group Size: 2-3 students

Target: Grades 4-5

Materials:

- 1 x 4 gallon bucket
- 1 x Minecraft-Inspired Rock Identification Game
- 6-9 kg. play sand per group.
- Projector and computer for presentation.

Preparation: Place 1/3 to 1/2 of an 18kg bag of play sand into a 4 gallon plastic bucket and place all of the specimen(s) included in the Minecraft-Inspired Rock Identification Game into different places into the sand. Place all of the included information cards with the specimen(s) face up.

Instructions:

Introduce the field of a geologist - show them the different geologist tools (hard hat, vest, magnets, notepad, etc.)

They get to practise the skills of a geologist by using the tools provided to uncover specimens from the sand and identify the minerals using the Minecraft-Inspired Rock Identification cards.

Campers get to dig through the bucket, find one sample each until everyone has found at least one sample. Campers will refer to Rock Identification cards to identify the mineral and keep score of how many they have found. Try to identify all 12 specimens as a team. Once all minerals have been discovered, each team has their own minerals on top of their respective ID cards.

Further discussion on the properties and utility of each specimens contained in the kit can be presented at the teacher's discretion. Extending the activity to "classify different rocks and minerals according to their composition and physical properties, using various tests and criteria" (Grade 4 Outcome E2.4 from the Ontario Curriculum) or other curricular elements can be helpful.

► Minecraft-Inspired Rock Identification - Quiz Show

Group Size: 3-4 students

Target: Grades 4, 5, and 12

Materials:

- 1 x Minecraft-Inspired Rock Identification Game per group
- Projector and computer for game show.
- Prizes (if suiting for the classroom)

Preparation: Collect the required number of Minecraft-Inspired Rock Identification Games for the class and remove all of the cards from each kit (make sure to keep them organised so that you can replace them afterwards). Set up a Jeopardy! style gameshow in the appropriate software (such as Factile) with the questions from the cards included in the kit. If there are relevant questions that complement the curricular outcomes you are covering, they may be a helpful addition to the competition.

Instructions:

1. Have students look through all of the specimens as a group. Have students write down all of the names of each mineral they know and have them guess at the utility they may have for us.
2. Have a discussion about each of the specimens and the utility of each. Each has special properties or characteristics that are relevant for daily life.
3. Have a competition with a Jeopardy! style software (such as www.playfactile.com) with each of the teams competing for points. If prizes are suitable for your classroom, they may be helpful.



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ONTARIO CURRICULAR OUTCOMES

The outlined activity does not fit with any specific curricular outcomes, but is meant to complement the learning experience of other lessons. This list may not include all relevant outcomes.

Grades 1-8

- A1.1 use a scientific research process and associated skills to conduct investigations
- A1.2 use a scientific experimentation process and associated skills to conduct investigations
- A1.3 use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems
- A1.4 follow established health and safety procedures during science and technology investigations, including wearing appropriate protective equipment and clothing and safely using tools, instruments, and materials
- A1.5 communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes

Grade 4

- E1.1 analyse ways in which geological processes impact society and the environment
- 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
- E2.1 explain geological processes that result in the formation of igneous, sedimentary, and metamorphic rocks, using the rock cycle
- E2.2 describe the physical properties of igneous, sedimentary, and metamorphic rocks
- E2.3 classify different rocks and minerals according to their composition and physical properties, using various tests and criteria
- E2.4 describe everyday uses of rocks and minerals
- E2.5 describe how fossils are formed and what information they can provide about Earth's history

Grade 5

- C1.1 assess the impacts on society and the environment of various processes used in the manufacture of common products
- C1.2 assess how the use of specific materials in the manufacture of common products affects the environment, and identify actions that society and individuals can take to mitigate negative impacts
- C2.7 explain why specific physical properties of various solids, liquids, and gases make them useful for particular applications
- E1.1 analyse long-term impacts of human uses of energy and natural resources, on society and the environment, including climate change, and suggest ways to mitigate these impacts
- E1.2 evaluate effects of various technologies on energy consumption, and describe ways in which individuals can use technology to reduce energy consumption
- E1.3 analyse how First Nations, Métis, and Inuit communities use their knowledges and ways of knowing to conserve energy and resources

Grade 12 (SES4U) - Earth and Space Science

- E1 analyse technologies used to explore for and extract Earth materials, and assess the economic and environmental impact of the exploitation of such materials;
- E2 investigate the properties of minerals and characteristics of rocks, including those in their local area;
- E3 demonstrate an understanding of the properties of minerals and the formation and characteristics of rocks.