BUILDING MINERAL LITERACY THROUGH STEM EDUCATION EST. 94 mining MATTERS

A BREAKDOWN OF THE CRITICAL

METALS IN A SMARTPHONE

Some vital metals used to build these devices are considered at risk due to geological scarcity, geopolitical issues or trade policy.

This infographic details the critical metals that you carry in your pocket.

ALKALI METAL
ALKALINE EARTH
TRANSITION METAL
POST-TRANSITION METAL
LANTHANOID

The Earth's natural resources power our everyday lives.

DISPLAY

The display contains several **rare earth elements**. Small quantities are used to produce the colors on the liquid crystal display. Some give the screen its glow.

- 57 La Lanthanum
- 59 Pr Praseodymium
- 63 Eu Europium
- 64 Gd Gadolinium
- 65 Tb Terbium
- 66 Dy Dysprosium

ELECTRONICS

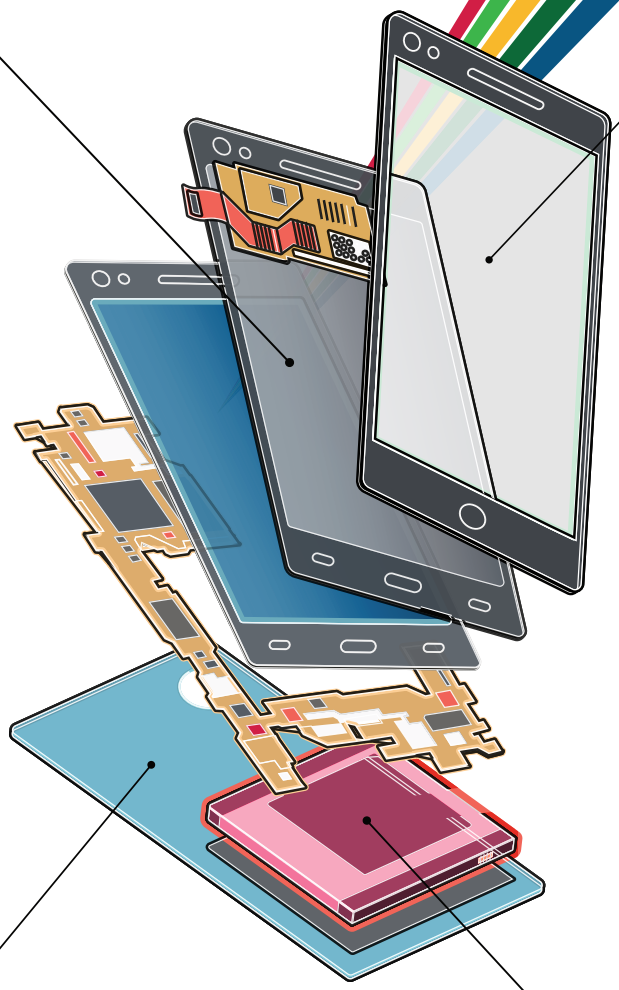
Copper is used for wiring and for micro-electrical components along with **gold** and **silver**. **Nickel** is used in electrical connections. **Gallium** is used in semiconductors. **Tantalum** is the major component of micro capacitors, used for filtering and frequency tuning.

- 31 Ga Gallium
- 28 Ni Nickel
- 73 Ta Tantalum
- 29 Cu Copper
- 79 Au Gold
- 47 Ag Silver

CASING

Nickel reduces electromagnetic interference. **Magnesium** alloys are superior at electromagnetic interference (EMI) shielding.

- 12 Mg Magnesium
- 28 Ni Nickel



TOUCH SCREEN

It contains a thin layer of **indium** tin oxide, highly conductive and transparent, allowing the screen to function as a touch screen.

- 49 In Indium

MICROPHONE, SPEAKERS, VIBRATION UNIT

Nickel is used in the microphone diaphragm (that vibrates in response to sound waves). Alloys containing **neodymium**, **praseodymium** and **gadolinium** are used in the magnets contained in the speaker and microphone. **Neodymium**, **terbium** and **dysprosium** are used in the vibration unit.

- 28 Ni Nickel
- 59 Pr Praseodymium
- 60 Nd Neodymium
- 64 Gd Gadolinium
- 65 Tb Terbium
- 66 Dy Dysprosium

BATTERY

The majority of smartphones use **lithium**-ion batteries. The battery casing is made of **aluminum**.

- 3 Li Lithium
- 27 Co Cobalt
- 13 Al Aluminum
- 28 Ni Nickel

In partnership with:

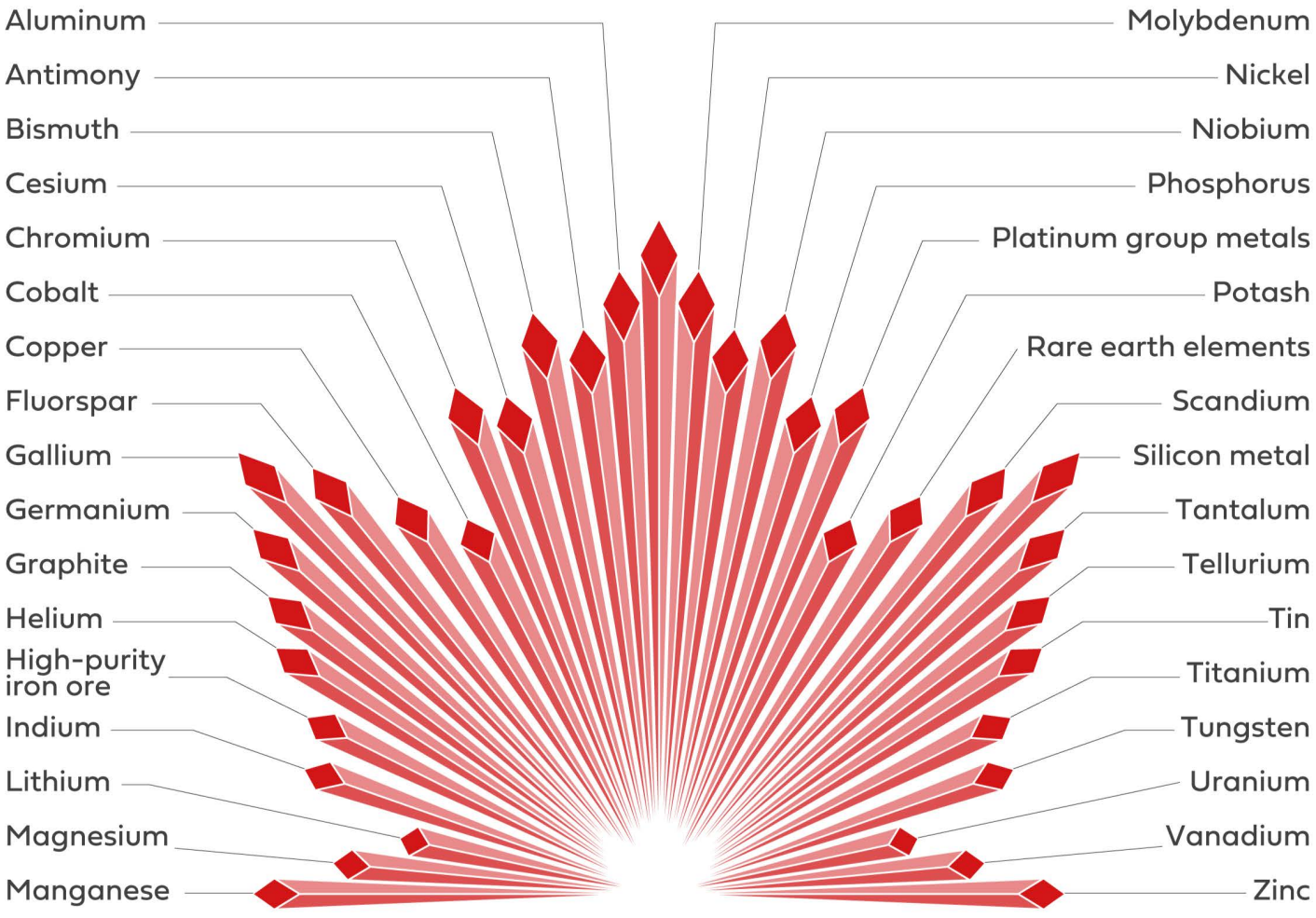
PDAC PROSPECTORS & DEVELOPERS ASSOCIATION OF CANADA

Source: University of Birmingham

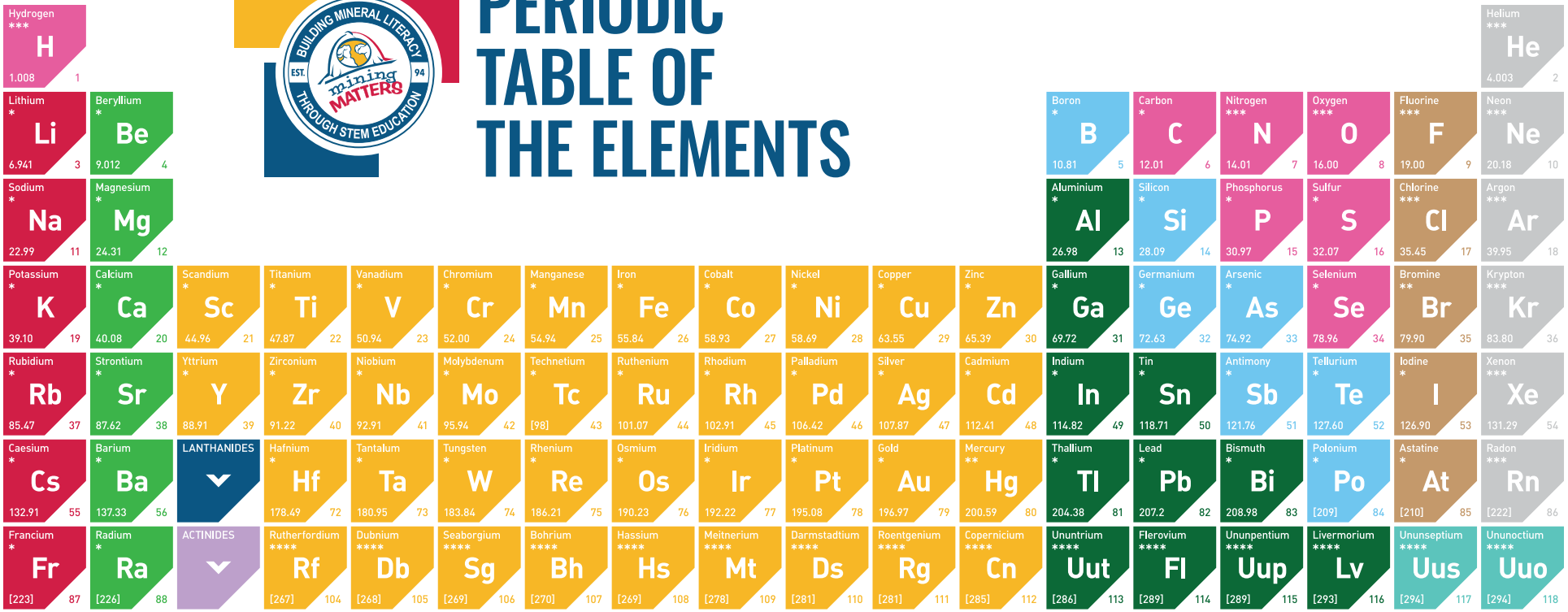
CANADA'S CRITICAL MINERALS

Critical minerals are the foundation upon which modern technology is built. They are used in a wide range of essential products ranging from mobile phones and solar panels to electric vehicle batteries, medical devices and defence applications. Canada's critical minerals list identifies 34 minerals and metals.

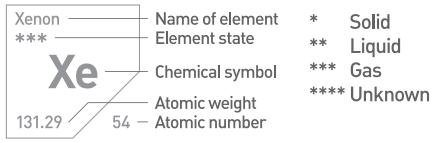
Image courtesy of
Natural Resources Canada



PERIODIC TABLE OF THE ELEMENTS



ALKALI METAL	LANTHANOID	UNKNOWN CHEMICAL
ALKALINE EARTH	ACTINIDE	NONMETAL
TRANSITION METAL	NOBLE GAS	HALOGEN
POST-TRANSITION METAL	METALLOID	



ELEMENTAL DEDUCTION

METALS IN A SMARTPHONE

Use the Periodic Table of Elements to find the elements that are used to make smartphones.

More than 40 mined metals and rare earths are used to produce a single smartphone.

ELECTRONICS

79	29	47
73	28	31

BATTERY

3	13
27	28

SOUND

60	64	28
59	65	66

TOUCH SCREEN

49

Mining is essential for innovative tech. Canada's mining industry is providing the responsibly-sourced minerals and metals that power the technologies of today and of the future.

Resource Credit: Mining Association of Canada

MiningNeedsYou.ca

Scan the QR codes for an immersive career quiz that matches your interests and skills with mining opportunities. Dive into the Interactive World of Mining Careers, where you'll explore diverse work settings, delve into career profiles, and uncover more at MiningNeedsYou.ca.

Career Quiz

Interactive World of Mining Careers

Resource Credit: Mining Industry Human Resources Council

Career Exploration

Whether you're skilled in trades, engineering, geoscience, computing, robotics, environmental studies, social work, or other areas, there's a career for you in mining. Visit MiningNeedsYou.ca to discover the possibilities.

Name two careers that catch your interest. What skills or qualifications do you believe are essential for these roles?

MINING MATTERS ACTIVITY SHEET

Symbol Sudkoku

Fill in the grid so that every row, every column and every 3 x 3 box contains each of the nine symbols below ONLY ONCE.

SYMBOLS

Ore Cart

Hard Hat

Magnifying Glass

Safety Boot

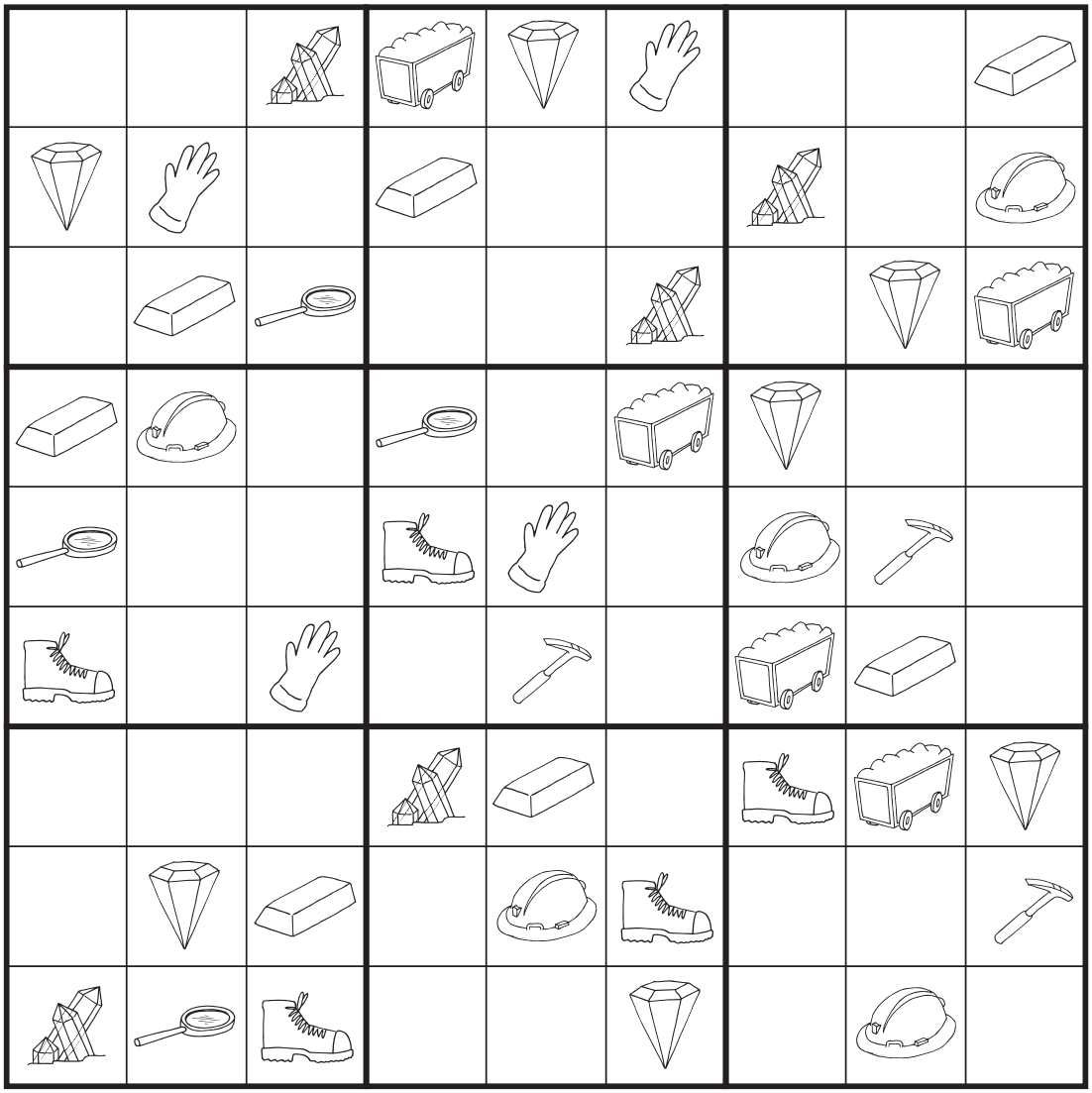
Rock Hammer

Diamond

Quartz

Gold Bar

Safety Gloves



Mine Evolution Game

A fun and interactive game designed by Science North and the Canadian Institute of Mining for anyone who has ever been curious about the modern mining industry.

Visit **MineEvolution.ca** to start building Canada's green future!

Mining Matters Virtual Escape Room

You find yourself in the mine's refuge station and need to complete a series of tasks to gain passwords, retrieve clues, interact with your surroundings and gather information needed to collect all your PPE to reclaim the mine and escape the dragon. Scan the QR code to escape the Refuge Station!

In partnership with:

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