MEDICINE UP FROM THE GROUND

ᒪᖅᑭᑭ ᐅᑎᓂᑲᒐᑌ ᐊᖑᑭᑲᔅ

English and Oji-Cree

From head to toe, skin to bone, brain to heart, the human body is made up of complex systems.

ᐅᑦᑎᑲᓐ ᒥᓇ ᓂᓯᑭᓯᑕᑦ, ᐅᓴᑲᔅ ᒥᓇ ᐅᑲᑐ, ᐅᐃᓐᑎᑊ ᒥᓇ ᐅᑌᖑᐃ, ᑲᐱᒪᑎᓯᒻ ᐊᐃᓐᔅᑯ ᐅᐃᓐᔅᑯᑭ ᒥᓱᓇᓴᔅ ᐃᓇᓄᑭᒪᑲᓂ.

Learning about them, looking after them, and enhancing them has challenged the health community since the dawn of medicine. Ancient healing practices, modern medicine, and tomorrow's discoveries rely on natural resources. The Earth supplies us with the metals and minerals that contain many of the components for our wellbeing. Canada produces more than 60 minerals and metals, many of them necessary to the world of medicine.

ᑲᑲᓇᑭᑭᑲᒐᑭᑦ, ᑲᑲᓇᐅᓐᒋᑲᒐᑭᑦ ᒥᓇ ᕿᐅᒋᐃᓐᒋᒋᑲᒐᑭᑦ ᑭᐱᐊᓂᒥᖑᐃᐅᓐᒪᑲᑦ ᕿᐅᒋᒥᓄᔭᓄᐊᓐᔅ ᐅᓐᑎ ᐱᑯ ᒪᐊᓐᒥ ᓂᑦᑕᑦ ᑲᐱᐅᒋᐊᔭᒪᑲᔅ ᒪᖅᑭᑭ. ᑲᔭᒡ ᑲᑭᐱᑐᒋᑲᒐᔅ ᓇᑕᐃᓐᖑᐃᐅᓐᐃᓐ, ᓄᑯᑦ ᑲᑭᓱᑲᔅ ᑲᐊᐸᑕᔅ ᒪᖅᑭᑭ ᐅᑲᓐ ᒥᓇ ᐊᓐᔅᒡ ᕿᓂᐊᐸᑕᔅ ᓇᓇᑕᐃᓐᑭᕿᕿᐃᓐᓇᑐ ᐅᒋᐊᐯᓂᒧᒋᑲᒐ ᐊᖑᑭᑲᔅ ᕿᑯᑭᑲᔅ. ᐊᖑᑭᑲᔅ ᕿᑯᑭᑐ ᑲᔭᒪᑲᑭᑦ ᑭᑐᑎᓇᒥᑦ ᐱᐊᓐᐱᑯᑐ ᒥᓇ ᐊᓯᓂᔅ ᑲᐊᓱᒋᓯᑭᑦ ᒥᓱᑦ ᑯᑭᑐᑦ ᑲᐅᒋᐃᓐᒋᖑᐃᑯᔭᔅ. ᑲᓇᑕ ᐊᖑᑭᔅ ᐅᑐᒋᐅᓱᑐᑐᑦ ᐊᐊᓐᓱᒥ 60 ᐊᓯᓂᔅ ᕿᑯᑭᑐᑦ ᒥᓇ ᐱᐊᓐᐱᑯᑦ, ᒥᓱᑦ ᐃᒪ ᐅᒋᐅᓱᒋᑲᒐᐊᓐᑦ ᒪᖅᑭᑭᑦ.

Mining Makes It Happen!
ᐊᓯᓂᕿᐃᓐᓂᔅ ᐅᒋᐊᓄᑭᒪᑲᑦ ᕿᑯᑭᑐᑦ!

medical DEVICES
ᒪᖅᑭᑭᐃᓐ ᐊᐸᒋᒋᑲᓇᑐᑦ

A medical office or a hospital features countless medical devices, tools, and machines made of metals and minerals, from needles and stethoscopes to sophisticated machines that look inside the body, without cutting, to examine bones, organs, and soft tissues.

- Surgical theatres and tools gleam with medical-grade stainless steel.
- Solid-state lasers, using Rare Earth Elements (REEs) holmium and thulium, make minimally invasive surgery possible.
- Orthopaedic implants allow people to regain normal function, thanks to stainless steel, titanium, and titanium alloys.

ᐊᑯᓯᐃᓐᑲᒥᑯᑦ ᐅᑕᔭᓇᐊᓐ ᓇᓇᑲ ᒪᖅᑭᑭᐃᓐ ᐊᐸᒋᒋᓇᑦ ᒥᓇ ᑲᐱᒥᐱᒐᑭᑦ ᑲᑭᐅᒋᐅᔅᒋᒋᑲᒐᑭᑦ ᐱᐊᓐᐱᑯᑦ ᒥᓇ ᐊᓯᓂᑲᔅ, ᑐᑲᑦ ᒋᒋᑕᖑᐃᑲᓇᐱᑯᑦ, ᓇᓇᑐᑕᒧᓂᔭᑦ ᒥᓇ ᑯᑕᑭᔭᑦ ᑲᒪᒪᑕᐊᓐᓄᑭᒪᑲᑭᑦ ᑲᐱᓴᐸᒋᑭᒪᑲᑭᑦ ᒥᔭᐃᓐᔅ, ᐅᑲ ᑲᑕᒻ ᒋᒪᒋᓇᒻ ᐊᐃᓐᔭ, ᑲᒥᒋᑲᒐᑲᓂᔅ ᐅᑲᓐᔅᑎᖑᐃᑯᓇᐃᓐᔅ ᑲᐅᒋᐅᔅᒋᒋᑲᒐᑭᑦ ᐱᐊᓐᐱᑯᑦ ᒥᓇ ᐊᓯᓂᔅ ᑲᐅᒋᐃᓐᒋᖑᐃᑯᔭᔅ. ᑲᓇᑕ ᐊᖑᑭᔅ ᐅᑐᒋᐅᓱᑐᑐᑦ ᐊᐊᓐᓱᒥ 60 ᐊᓯᓂᔅ ᕿᑯᑭᑐᑦ ᒥᓇ ᐱᐊᓐᐱᑯᑦ, ᒥᓱᑦ ᐃᒪ ᐅᒋᐅᓱᒋᑲᒐᐊᓐᑦ ᒪᖅᑭᑭᑦ.

Diagnosis
ᑲᐃᓐᒋᑲᒐᔅ ᐊᓂᑦ ᐅᓇᐱᓇᔮᒻ

Mineral elements are often used to help diagnose a patient's condition, whether in conjunction with medical devices to show a picture of the body's internal function or in medical research.

A magnetic resonance imaging (MRI) machine detects contrast agents, injected into patients to make certain tissues, abnormalities, or disease processes more clearly visible. Contrast agents include manganese-, iron-, and gadolinium-based substances.

X-ray machines detect technetium-99m, derived from decaying uranium, and the most commonly used isotope in nuclear medicine, to reveal brain, heart, and bone abnormalities.

ᐊᓯᓂᑲᔅ ᑲᐅᒋᒪᑲᑭᑦ ᕿᑯᑭᑦ ᓂᑕᐊᐸᒋᒋᑲᒐᐊᓐᑦ ᕿᐅᒋ ᑭᕿᒋᑲᒐᓂᔅ ᐅᑕᑯᓯ ᑲᐃᓇᐱᓇᔮᒻ, ᑐᑲᑦ ᑯᑕᑭᔭᑦ ᑲᐊᓱᒋᐊᐸᑕᑭᑦ ᒪᖅᑭᑭᐃᓐ ᐊᐸᒋᒋᑲᓇᑦ ᕿᐅᒋ ᐊᓐᐸᒋᑲᒐᓂᔅ ᐱᒋᒥᔭᐃᓐᔅ ᑲᐃᓱᑲᓂᔅ ᓇᑐᑕ ᒪᖅᑭᑭᐃᓐ ᐊᐸᒋᒋᑲᓇᑦ ᕿᐅᒋ ᐊᓐᐸᒋᑲᒐᓂᔅ ᐱᒋᒥᔭᐃᓐᔅ ᑲᐃᓱᑲᓂᔅ ᓇᑐᑕ ᒥᖅᑭᑭᐃᓐ ᒥᒋᑲᕿᕿᓇᑦ.

LLᑕᐊᓐᐱᔅ ᒪᓯᓇᐃᐱᒋᑲᑦ (MRI) ᐊᓐᐸᕿᒪᑲᑦ ᕿᑯᑭᑦ, ᕿᐅᒋᓇᑲᔅ ᕿᓱᓇᑲᔅ ᐃᓐᔭᓯᔅ, ᕿᑯᑭᑦ ᑲᓂᑕᐃᓐᑭᒪᑲᑭᑦ ᓇᑐᑕ ᐊᑯᓯᐃᓐᑦ ᑲᓇᓇᑐᓂᑲᒐᔅ ᕿᐅᒋᐸᔭᒐᓇᑲᔅ. ᐅᑲᓂᐊᓐᑦ ᐊᐸᑕᑦ ᑲᑲᒋᐊᓄᒪᑲᔅ ᒪᓯᓇᐃᐱᒋᑲᑦ ᒪᑦᑲᓂᑦ, ᑲᑯᓯᑲᔅᐱᑲᔅ ᐱᐊᓐᐱᔅ ᒥᓇ ᑲᑐᒥᐅᓱᑦᑭᑦ ᑲᐅᒋᒋᓂᑲᐃᓐᑭᑦ.

ᒪᓯᓇᐃᐱᒋᑲᓇᑦ ᐊᐸᑕᑦ ᐃᔅᑎᔭᑦ - 99, ᐅᑎᓂᑲᒐ ᑲᐊᓐᓇᑕᔅ ᓱᐧᐊᔭᑦ, ᕿᑲᔅ ᐃᕿᓐ ᒪᐊᓐᒥ ᓂᑕᐊᐸᑕᑦ ᐊᔅᓯᑦ ᑲᒪᑭᓯᕿᒪᑲᔅ ᒪᖅᑭᑭ, ᑲᓇᓇᑐᓂᑲᒐᔅ ᐃᓐᑎᑊ, ᐅᑌᖑᐃ ᒥᓇ ᐅᑲᑦ ᑲᐃᓱᐊᑯᓯᓇᓂᐊᓐᔅ.

BODY IN BALANCE
ᒥᔭᑭ ᑲᓐᔭᔅ ᑲᐊᓄᑭᒪᑲᔅ

The human body is 96 per cent made up of six elements: oxygen, carbon, hydrogen, nitrogen, calcium, and phosphorus.

ᑲᐱᒪᑎᓯᒻ ᐊᐃᓐᔭ ᐅᐃᓐᔭᑭ ᕿᑲᔅ ᒥᓯᐅᔅ 96% ᐊᔭᒪᑲᓂ ᐅᑐᓂᐊᓐᑦ ᕿᑯᑭᑦ: ᐸᑭᑕᓇᒧᐃᓐᑦ, ᑲᕝᐱᑦ, ᐊᔭᓯᕝᐅᒋᑦ ᑲᓴᓂᐊᓐᔅ, ᓇᔭᕝᐅᒋᑦ ᑲᓴᓂᐊᓐᔅ, ᑲᕝᓯᔭᑦ ᒥᓇ ᐸᑦᑕᐊᕝᐅᒋᑦ.

The remaining 4% comprises trace elements essential to various functions. All of these elements and more are found in Earth's four spheres—lithosphere, atmosphere, hydrosphere, and biosphere—where they combine in different ways and continually cycle between the spheres.

ᐅᑲᓐ ᒥᓇ ᑭᔭᐱᒻ 4% ᐊᔭᒪᑲᓂ ᕿᑯᑭᑦ ᕿᐅᒋᐊᓄᑭᒪᑲᔅ ᒥᔭᐃᓐᔅ. ᑲᑭᓇ ᐅᑐᓂᐊᓐᑦ ᕿᑯᑭᑦ ᒥᓇ ᑯᑕᑭᔭᑦ ᐊᔭᒪᑲᑦ ᐊᖑᑭᑲᔅ ᓂᐊᓐᔅᔅ ᑲᐅᒋᒪᒪᑦ ᐃᓐᑕᓄᑭᒥᑐᒪᑲᑭᑦ ᓵ ᐊᓐᑭᑕᑲᒥᔅ, ᐃᖑᐱᒥᔅ, ᓂᐱ ᒥᓇ ᑎᑦᐸᑲᒥᔅ ᓵ ᑲᐅᒋᒪᒪᐃᓐ ᐊᓄᑭᒪᑲᑭᑦ ᓴᑯᒻ ᑕᖑ ᐅᑦᐸᑲᑦ ᐅᓯᐱᒪᓄᑭᒪᑲᑭᑦ ᑲᓂᐱᒥ ᒪᒥᖑᑭᒋ ᐊᓄᑭᒪᑲᑭᑦ.

As part of that cycle, we take in and release our delicately balanced combination of elements; depletion or imbalance causes our systems to suffer. To achieve that balance, we must eat nutritious food, whether animal or vegetable in origin, supported by mineral-rich soil. Where elements are missing, we turn to other sources.

ᐅᑲᓐ ᐅᑐᓐ ᑲᐃᓱᐱᒥᐊᓄᑭᒪᑲᔅ, ᑭᑐᑕᐱᓇᒥᑦ ᐅᑲᓐ ᑭᐅᓐᐱᓇᒥᑦ ᑲᐊᓐᕿᐃᓐᓇᑲᔅ ᑲᐅᒋᒪᒪᐃᓐ ᐊᓄᑭᒪᑲᑭᑦ ᕿᑯᑭᑦ, ᒪᑭᓂᕿᐃᑦ ᓇᑐᑕ ᐅᑲ ᐊᐱᑦ ᑲᒥᓄᐊᓄᑭᒪᑲᔅ ᑭᑐᒋᐊᑯᓯᖑᑲᑯᒥᑦ. ᐅᑲᓐ ᑕᖑ ᕿᑭᐅᒋ ᒥᓄᐊᓄᑭᒪᑲᔅ, ᒋᒥᒋᔭᔅ ᑲᒥᓄᖑᕿᒪᑲᑭᑦ ᒥᒋᒪᑦ, ᑭᔭᑦ ᐊᐃᓐᔭᓱᖑ ᓇᑐᑕ ᑭᑎᑲᑦ, ᑲᐅᒋ ᓂᑕᐃᓐᑭᒪᑲᑭᑦ ᑲᐃᓱᒥᓇᓐᔅᔅ ᐊᓱᖑᑭ. ᐊᐱ ᐅᑲ ᑲᔭᒪᑲᑭᑦ, ᐸᑲᑦ ᑭᑎᓱᓇᓇᑐᓂᕿᒥᑦ.

TREATMENTS
ᓇᑕᐃᓐᖑᐃᐅᓐᐃᓐᓇᑐᑦ

The list of metals and minerals used for medical treatment is long, including ancient and modern remedies.

ᓇᐱᒻ ᑭᓇᔅ ᑲᓂᐱᒐᓯᓇᖑᐃᑲᒐᑭᑦ ᐱᐊᓐᐱᑯᑦ ᒥᓇ ᐊᓯᓂᔅ ᑲᐅᑎᓂᑲᒐᑭᑦ ᓇᑕᐃᓐᖑᐃᐅᓐᐃᓐᓇᑐᑦ, ᐊᓱᒻ ᑲᔭᒡ ᑭᑭᐱᐊᐸᑕᑭᑦ ᒥᓇ ᓄᑯᑦ ᑲᐊᐸᑕᑭᑦ.

Egyptians ingested gold for mental, bodily, and spiritual purification, and gold has been used to fix teeth for over 4,000 years. In the 20th century, gold compounds were found to alleviate symptoms of rheumatoid arthritis.

ᐃᒋᒥ ᐊᖑᑭᔅ ᑲᐅᒋᐊᓐᒻ ᐅᑭᒥᒋᓇᐊᓐ ᐅᓴᐃᓐᓇᓂᔭᓇᐱᑯᑦ ᕿᑭᐅᒋ ᐸᔭᑭᖑᐃᑎᓱᐊᓐᑫᐊᓐᒻ ᐅᒪᒥᑐᒋᑲᓂᐊᓐ, ᐃᓐᔭᐃᓐᐊᓐᔅ ᒥᓇ ᐅᑕᒐᐃᓐᓂᐊᓐᔅ, ᕿᑲᔅ ᒥᓇ ᐅᓴᐃᓐᓇᓂᔭᓇᐱᔅ ᑭᐱᓇᐸᑎᓯ ᐊᐊᓐᓱᒥ 4,000 ᑕᓱᐊᖑᑭ ᕿᐅᒋᐊᓐᕿᓐᓱᖑᐃᑕᑦ ᐃᓐᐱᑕᔅ. ᕿᑲᔅ ᐊᐱᑦ ᑲᓂᐅᒋᒋᓱᔅ 20 ᑕᓱᒥᑕᓱᒥᑕᓇ ᐊᖑᑭᐃᓐᑦ, ᑭᒥᑭᑲᒐ ᓇᓂᔭᐊᓯᓂᐊᓐᔅ ᑲᐊᐸᑕᔅ ᕿᐅᒋᐊᒐᒪᒋᖑᐅᓇᓂᐊᓐᔅ ᑲᑲᓇᐱᓇᐃᓐᑦ.

Silver, having anti-bacterial properties, is added to bandages and wound-dressings, catheters, and other medical instruments. Lithium medication helps depression sufferers, and sulphur treats skin diseases, arthritis, and chronic bladder inflammation.

ᐊᓐᐱᑭᓇᓂᔭᓇᐱᔅ, ᑕᑲᑦ ᑲᐸᔭᑲᔅ, ᐃᒪ ᐃᓱᐊᓱᑎᓂᑲᒐ ᐊᑯᐱᓯᓂᑭᓄᑦ, ᑲᐱᑕᐱᕿᓂᑲᒐᔅ, ᒥᓇ ᑯᑕᑭᔭᑦ ᒪᖅᑭᑭᐃᓐ ᐊᐸᒋᒋᑲᓇᑦ. ᕝᐃᑎᔭᑦ ᒪᖅᑭᑭ ᐅᐃᓐᖑᐃᓇᐊᓐ ᑲᓯᐱᖑᑲᒐᑕᒧᐊᓐᐱᓇᑦ, ᒥᓇ ᓱᕝᐳᕝ ᐃᓐᖑᐃᐅᓐᓇᑦ. ᑲᑲᓇᐱᓇᐃᓐᑦ ᒥᓇ ᓱᑭᐃᓂᔅ ᑲᓂᑕᐃᓱᐸᑭᔭᒻ.

The fight against cancer employs radiation treatment using radioactive isotopes of iodine, yttrium, samarium, palladium, and more. Chemotherapy, another cancer-fighting treatment, commonly uses platinum compounds to target and damage DNA in cancer cells.

ᑲᒥᑲᒋᑲᒐᔅ ᒪᓂᒍᓱᐊᓐᐱᓇᐃᓐᑦ ᐊᐸᑕᑦ ᒐᑭᓯᐅᓐᐃᓐᑦ ᐅᐊᐸᑕᔅ ᑲᒪᖅᑭᑭᓐᔅ ᑭᑭᐅᓱᒋᑲᒐᔅ ᒪᖅᑭᑭ ᐊᔭᓯᑦ ᑲᐊᓱᑎᓂᑲᒐᔅ ᐊᔭᑕᔭᑦ, ᐊᔭᕝᐅᕝᐃᔭᑦ, ᓴᒪᕝᐅᕝᐃᔭᑦ, ᐸᕝᐅᑎᔭᑦ ᒥᓇ ᑯᑕᑭᔭᑦ. ᑭᒍᒐᕝᐊᑎ, ᑯᑕᔅ ᐃᐅᓐ ᑲᐊᐸᑕᔅ ᒪᖅᑭᑭ ᒋᓂᓯᑯᐊᓐᒻ ᒪᓂᒍᓴᔅ, ᐊᐸᑕᑦ ᕝᐊᑎᓇᑦ ᐱᐊᓐᐱᔅ ᒋᓂᓯᑯᐊᓐᒻ ᒪᓂᒍᓴᔅ ᑲᐅᒋᐅᓱᖑᐅᓐᒻ.

a different approach to HEALING
ᑯᑕᑭᔭᑦ ᐸᐸᑲᑦ ᓇᑕᐃᓐᖑᐃᐅᓐᐃᓐᑦ

Traditional western medicine has found numerous uses of metals and minerals, but alternative medicine suggests other approaches.

In Hinduism, crystals such as azurite, kyanite, ruby, and amethyst are believed to balance and amplify a person's energy, and placing crystals on energy focal points on the body, or chakras, is believed to promote healing.

Copper and iron figure largely in modern medicine, but many people use them in alternative approaches, believing that wearing copper relieves arthritis and wearing magnets alleviates pain and other health concerns.

Indigenous cultures have long used the healing powers of mud, rich with clay minerals. In Canada, the Heiltsuk First Nation has used mineral-rich clays for centuries for both external and internal medicine. Natural medicine today suggests bentonite clay, made up of weathered volcanic ash, for many internal and external uses.

ᓂᑦᑕᑦ ᐅᔅᒥᑎᑯᓂᐃᓐ ᒪᖅᑭᑭ ᑲᑭᐱᓇᑕᐃᓐᖑᐅᐊᓐᑲᓄᐊᓐᔅ ᑭᐅᑎᓂᑲᒐᐊᓐᑦ ᐱᐊᓐᐱᑯᔅ ᒥᓇ ᐊᓯᓂᑲᔅ. ᐅᑲᓐ ᑯᑕᑭᔭᑦ ᐸᐸᑲᑦ ᓇᑕᐃᓐᖑᐃᐅᓐᐃᓐᑦ ᐊᐸᒋᒋᑲᒐᐊᓐᑦ.

ᐅᑲᓐ ᐃᒪ ᖑᐃᑦᑐᐃᓯᑦ, ᕿᑦᑐᑦ ᑐᑲᑦ ᐊᓇᕝᐅᓯ. ᑲᔭᓇᔭ, ᕝᐅᐱ ᒥᓇ ᐊᒥᑎᑦ ᐊᓯᓂᔅ ᑭᐸᐸᑎᓯᐊᓐᔅ ᐅᓇᒋᑲᒐᔅ ᒋᑕᐱᑕᐃᓐᓯᒻᑲᑭᒪᑲᔅ ᒥᓇ ᒋᐅᒋ ᐃᓐᒋᖑᐃᑯᒻ ᐊᐃᓐᔭ ᑭᑭᓯᐊᐃᓐᓯᒻ, ᐅᑲᓐ ᓇᑯᒻ ᒥᓱᑦ ᐊᐃᓐᔭᔅ ᐅᑕᐸᒋᑐᓇᐊᓐ ᐸᑲᑦ ᐃᓇᑭ ᐅᓴᐊᓐᐱᔅ ᒥᓇ ᐊᓐᐸᒋᑲᒐᐊᓐᑦ ᐊᐸᒋᒋᑲᒐᐊᓐᑦ. ᐅᑲᓐ ᑕᖑ ᕿᑭᐅᒋ ᐅᑕᐸᒋᑐᓇᐊᓐ ᐸᑲᑦ ᐃᓇᑭ ᐅᓴᐊᓐᐱᔅ ᒥᓇ ᐊᓐᐱᑭᑦ ᐊᐸᒋᒋᑲᒐᐊᓐᑦ. ᐅᑲᓐ ᐃᒪ ᑲᓇᑕ ᐊᖑᑭᔅ ᑲᑭᐅᒋᐅᓱᒋᑲᒐᔅ ᐅᑕᐃᓐᖑᐃᐅᓐᐃᓐᑦ ᐊᐸᒋᒋᑲᒐᐊᓐᑦ.

ᐅᓴᐊᓐᐱᔅ ᒥᓇ ᐊᓐᐱᑭᑦ ᑭᒋᐊᐸᑕᓄᑦ ᓄᑯᑦ ᓇᑕᐃᓐᖑᐃᐅᓐᐃᓐᑦ ᐊᐸᒋᒋᑲᒐᐊᓐᑦ. ᐅᑲᓐ ᓇᑯᒻ ᒥᓱᑦ ᐊᐃᓐᔭᔅ ᐅᑕᐸᒋᑐᓇᐊᓐ ᐸᑲᑦ ᐃᓇᑭ ᐅᑎᓱᐊᐸᒋᑐᓇᐊᓐ ᐅᐃᓇᑕᒧᐊᓐᒻ ᑲᑭᑭᓯᑲᒐᐊᓐᒻ ᐅᓴᐊᓐᐱᑯᓂ ᐅᐅᒋ ᐊᒐᒪᒋᖑᐅᓐᒻ ᑲᐅᓇᐱᓇᐃᓐᑦ ᐊᐸᒋᒋᑲᒐᐊᓐᑦ.

ᐅᓴᐊᓐᐱᔅ ᒥᓇ ᐊᓐᐱᑭᑦ ᑲᒋᐊᐸᑕᓄᑦ ᓄᑯᑦ ᓇᑕᐃᓐᖑᐃᐅᓐᐃᓐᑦ, ᐅᑲᓐ ᓇᑯᒻ ᒥᓱᑦ ᐊᐃᓐᔭᔅ ᐅᑕᐸᒋᑐᓇᐊᓐ ᐸᑲᑦ ᐃᓇᑭ ᐅᑎᓱᐊᐸᒋᑐᓇᐊᓐ ᐅᐃᓇᑕᒧᐊᓐᒻ ᑲᑭᑭᓯᑲᒐᐊᓐᒻ ᐅᓴᐊᓐᐱᑯᓂ ᐅᐅᒋ ᐊᒐᒪᒋᖑᐅᓐᒻ ᑲᐅᓇᐱᓇᐃᓐᑦ ᐊᐸᒋᒋᑲᒐᐊᓐᑦ.

ᐊᓂᓱᓂᓂᐊᓐᔅ ᐅᔅᖑᑲᒻ ᐅᑭᐱᐊᐸᒋᑐᓇᐊᓐ ᑲᓇᑕᐃᓐᖑᐃᐅᓐᒪᑲᔅ ᐊᓱᖑᑭ ᑲᐊᓱᒋᒋᓯᔅ ᐊᓐᐱᑲᓂ ᐊᓯᓂᔅ. ᐅᒪ ᑲᓇᑕ ᐊᖑᑭᔅ ᖑᐃᕝᔅᓴᔅ ᐊᓂᓱᓂᓂᐊᓐᔅ ᐅᑭᐱᒥᐊᐸᒋᑐᓇᐊᓐ ᒥᓱᓇᓐ ᒥᑕᓱᒥᑕᓇ ᑕᓱᐊᖑᑭ ᑲᑭᓇᑕᐃᓐᖑᐅᐊᓐᑫᐊᓐᒻ. ᓇᑐᒪᖅᑭᑭ ᓄᑯᑦ ᑲᐊᐸᑕᔅ ᐊᐸᑕᑦ ᐯᔅᑐᓇᔭᒻ ᐊᓐᐱᑲᑦ, ᐊᓇᒥᐱᑯᑎᓇᔅ ᐊᑲᒐᔅ, ᒥᓱᓇᓐᔅ ᐃᓇᐸᑕᑦ ᑲᓇᑕᐃᓐᖑᐅᐊᓐᑦ.

KEY TERMS
ᒪᔭᑦ ᐃᓐᒋᑭᐃᓐᓇᑐᑦ

A **PURE SUBSTANCE** consists of matter that comprises only one type of particle and that can be classified as either an element or a compound. E.g., **Gold (Au), Oxygen (O_2), and water (H_2O)**

ᑲᐸᔭᑲᔅ ᕿᑯᑭᑦ ᑲᐊᓱᒋᒋᓯᔅ ᐯᓱᔅ ᐅᑕ ᕿᑯᑭᑦ ᐃᒪ ᑲᔭᒪᑲᔅ. ᑐᑲᑦ ᐅᔭᐃᓐᓇᓂᔭᓇᐱᔅ (Au), ᐸᑭᑕᓇᒧᐃᓐᑦ (O_2), ᒥᓇ ᓂᐱ (H_2O)

An **ELEMENT** is the simplest form of a pure substance; it cannot be broken down using chemical methods. E.g., **Copper (Cu)**

ᕿᑯᑭᑦ ᑲᔭᒪᑲᔅ ᒪᐊᓐᒻ ᑲᐸᔭᑲᔅ, ᑲᐃᓐᑦ ᑕᑭᐊᓱᒋᑎᓂᑲᒐᓯᑦ ᑯᑕᔅ ᕿᑯᑭᑦ. ᑐᑲᑦ ᐅᔭᐊᓐᐱᔅ (Cu)

A **COMPOUND** is a pure substance made up of two or more different elements chemically combined. E.g., **Sodium fluoride (NaF)**

ᕿᑯᑭᑦ ᑲᐸᔭᑲᔅ ᕿᑯᑭᑦ ᑲᐊᓱᒋᒋᓯᑦ ᓂᓱᑦ ᓇᑐᑕ ᓂᒻᓯᑦ ᐸᑲᑦ ᕿᑯᑭᑦ. ᑐᑲᑦ ᓱᑎᔭᑦ ᐸᐊᕝᐅᕝᔭᑦ (NaF)

A **MINERAL** is a natural compound formed through geological processes; to be considered a "true" mineral, it must be solid, inorganic, and crystalline, with a defined chemical composition. E.g., **Sodium chloride (NaCl)**

ᐊᓯᑦ ᑲᑭᐅᒋᐅᓱᖑᐅᒻ ᐅᑲᓐ ᐊᐱᑦ ᑲᑭᒧᓇᖑᐊᓯᓂᐊᓐᓯᒻ, ᒥᖑᐅᓐ ᒪᔭᑦ ᐯᐯᓐ ᑲᐊᓯᓂᐃᓐᒻ, ᑲᒪᖑᑲᐃᓐᓯᒻ, ᐅᑲ ᕿᑯᑭᑦ ᑲᐊᓱᒋᒋᓯᔅ ᒥᓇ ᑲᓇᐸᐃᓯᒻ ᒥᓇ ᑕᑭᑕᑲᓂᑲᒥᓂᑲᒐ ᕿᑯᑭᑦ. ᑐᑲᑦ ᓱᑎᔭᑦ ᐸᐊᕝᐅᕝᔭᑦ (NaCl)

A **MIXTURE** is a combination of two or more pure substances, in which each pure substance retains its individual chemical properties. E.g., **Alloy (steel)**

ᑲᒪᒪᐃᓐᓯᑭᑦ ᓂᓱᑦ ᓇᑐᑕ ᐊᐊᓐᓱᒥ ᑲᐸᔭᑲᑭᑦ ᕿᑯᑭᑦ, ᕿᑲᔅ ᐃᕿᓐ ᐯᓱᔅ ᑲᑎᐱᓇᕿᐊᓐᐊᔭᒪᑲᔅ ᕿᑯᑭᑦ. ᑐᑲᑦ ᑲᒪᒪᐃᓐᓂᑲᒐᔅ (ᐱᐊᓐᐱᔅ)

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NATURAL RESOURCES

ᐊᓪᓚᕝᕕᐅᔪᑦ ᐅᔭᕋᒃ ᑯᐊᐅᒪᔪᑦ ᑭᖑᓇᐃ ᐸᐃᖅᑕᒃ

LEGEND ᑭᒡᓇᐅᑦᓯᓂᖅᑕᐅᔪᑦ

Alkali metals | Alkaline earth metals | Actinides | Transition metals | Other metals | Non-metals

Halite

SODIUM (Na) *Atomic Number: 11*

Sodium, an essential element in the human body, is found in numerous minerals such as feldspars, sodalite, and halite. It helps maintain proper muscle and nerve function, stable blood pressure levels, and balance of water in and around cells.

Sylvite

POTASSIUM (K) *Atomic Number: 19*

Potassium, an element available from potash sources such as the minerals sylvite and carnallite, is an electrolyte in the human body. It helps maintain proper function of all cells, tissues, and organs. It plays a key role in heart function, as well as skeletal and smooth muscle contraction. As an electrolyte, it conducts electricity in the body, along with sodium, chloride, calcium, and magnesium.

Lepidolite

CESIUM (Cs) *Atomic Number: 55*

Cesium, a very rare element, occurs in granite pegmatites rich with the minerals pollucite and lepidolite. Its main biomedical use is the separation of deoxyribonucleic acid (DNA). Cesium chloride treats all forms of cancer and shows potential as an alternative cure.

Gypsum/Selenite

CALCIUM (Ca) *Atomic Number: 20*

Calcium is obtained from the minerals calcite and gypsum, and from the rocks limestone, dolostone, and marble. Calcium is the fifth most common element in the human body; as a structural material, it occurs in cell walls, bones, and teeth. It plays a role in regulating the heartbeat and in blood clotting. Calcium supplements help maintain bone density as people age.

Barite

BARIUM (Ba) *Atomic Number: 56*

Barium, a soft silvery metal, comes primarily from the mineral barite. Barium is used as an X-ray radiocontrast agent for imaging the human gastrointestinal tract. Barite blocks X-ray and gamma-ray emissions; it is added to high-density concrete for radiation shielding around X-ray units in hospitals.

Uraninite

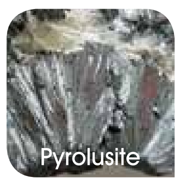
URANIUM (U) *Atomic Number: 92*

Uranium, relatively common in the Earth's crust, comes from the mineral uraninite, also known as pitchblende. It fuels nuclear reactors around the world, some of which produce technetium-99m (Tc-99m), the most-used radiopharmaceutical in nuclear medicine. The National Research Universal reactor in Chalk River, Ontario, is one of five reactors that supplies the world's Tc-99m, used for the diagnosis and treatment of life-threatening diseases.

Rutile

TITANIUM (Ti) *Atomic Number: 22*

Titanium, from the minerals rutile and ilmenite, offers the strength of steel with only 60 per cent of the weight, as well as high corrosion resistance. As metallic biomaterials, titanium and titanium alloys are used for implants, from dental implants and hip replacements to heart pacemakers and cochlear implants.



Pyrolusite

MANGANESE (Mn) *Atomic Number: 25*

Manganese usually occurs with iron or in other minerals. When mined, it is primarily derived from the mineral pyrolusite. Manganese is required for normal biological functions in humans, including development, metabolism, and the antioxidant system.

Hematite

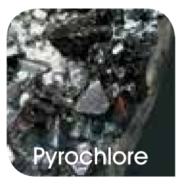
IRON (Fe) *Atomic Number: 26*

Iron, the fourth most abundant element in the Earth's crust, is most often extracted from the minerals hematite and magnetite. The body gets iron from food, using it to help metabolize proteins and to make hemoglobin, which carries oxygen from the lungs to the rest of the body.

Sphalerite

ZINC (Zn) *Atomic Number: 30*

Zinc, from minerals such as sphalerite and smithsonite, is the fourth most commonly used metal and the second most common trace metal in the human body. As an important micronutrient, it helps generate cells, activate bone and organ development, enable brain functions, and strengthen the immune system. Zinc deficiency, correctible by supplements, can cause stunted growth, and impeded intellectual development.



Pyrochlore

NIOBIUM (Nb) *Atomic Number: 41*

Niobium is derived from the minerals pyrochlore and columbite. It is a lustrous, grey, ductile metal with a high melting point, relatively low density, and superconductor properties. Magnetic resonance imaging (MRI) and nuclear magnetic resonance (NMR) machines use superconductor magnets made from niobium-titanium alloy embedded in copper.

Molybdenite

MOLYBDENUM (Mo) *Atomic Number: 42*

Molybdenum, from the mineral molybdenite, contributes corrosion resistance and hardness to stainless steel, making it excellent for sharp cutting edges, like scalpel blades. Molybdenum components are also found in the high-power X-ray tubes of computerized axial tomography (CAT or CT) scanners used to take images of bones, internal organs, blood vessels, and other soft tissue to detect a variety of diseases and conditions.

Gold

GOLD (Au) *Atomic Number: 79*

Gold is widely distributed in the Earth's crust in low concentrations; it is mined directly and also recovered as a by-product, primarily of copper mining. Used in dentistry for more than 4,000 years, gold's biocompatibility now proves useful in diagnosing and combating disease. Gold nanoparticles help diagnose malaria and treat cancer.

Galena

LEAD (Pb) *Atomic Number: 82*

Lead, a metal found in the mineral galena, is heavy and has high molecular density. This density works to provide radiation shielding in applications such as X-ray imaging and positron emission tomography (PET) scans, which involve a radiopharmaceutical.

Bismuth

BISMUTH (Bi) *Atomic Number: 83*

Bismuth is primarily produced as a by-product, mostly from processing lead ores; some comes from tungsten ores. Bismuth is found in pharmaceuticals often in treatments for gastrointestinal issues or salves for wound infections.

Sulphur

SULPHUR (S) *Atomic Number: 16*

Sulphur is a yellow, brittle, non-metallic element, primarily obtained by removing sulphur-containing contaminants from natural gas and petroleum using a process called hydrogenation. Synthetic sulphur is used to treat arthritis, skin diseases such as psoriasis and eczema, and interstitial cystitis, a chronic bladder inflammation.

Pentlandite

SELENIUM (Se) *Atomic Number: 34*

Selenium, primarily a by-product of copper refining, typically from chalcopyrite, also occurs in sulphide minerals containing pentlandite, mined for nickel, and galena, mined for lead. It is a trace element nutrient in the human body, essential for proper immune system function, thyroid gland function, and cell usage of thyroid hormone.

VISIT: http://ed.ted.com/periodic-videos to see a video lesson about every element on the periodic table.

RARE EARTH ELEMENTS

Fifteen lanthanide elements and the metals yttrium and scandium make up the group of Rare Earth Elements (REEs). REEs are generally found together in deposits and are abundant in the Earth's crust; however, they do not occur in large concentrations, so are difficult to mine. The world's most abundant REE source is bastnäsite, followed by monazite. REEs are usually high-lustre silver, silvery-white, or grey metals.

BASTNÄSITE

MONAZITE

YTTRIUM (Y) *Atomic Number: 39*

Yttrium gives a sharp edge to specialty scalpels and needles. Yttrium-stabilized ceramics are used in artificial joints and other prosthetics.

LANTHANUM (La) *Atomic Number: 57*

Lanthanum, in the form of lanthanum carbonate, rids the body of excess phosphate in the treatment of hyperphosphatemia (excess phosphate in the blood) and renal failure.

SAMARIUM (Sm) *Atomic Number: 62*

Samarium, in the form of isotope samarium-153, is a radiopharmaceutical used to alleviate pain from cancer that has spread to bone.

GADOLINIUM (Gd) *Atomic Number: 64*

Gadolinium has paramagnetic properties that work in compounds injected into the body to enhance contrast when using MRI machines.

HOLMIUM (Ho) *Atomic Number: 67*

Holmium is found in solid-state lasers used in medical applications such as tissue ablation, kidney stone removal, and prostate surgery.

THULIUM (Tm) *Atomic Number: 69*

Thulium is used as a radiation source in portable X-ray devices and for cancer treatment via brachytherapy (implanted radioactive seeds).

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