



ON things

SPORTS EDITION

Resourcing tomorrow
**Australian
Mining**

Produced by the
Minerals Council of Australia


**WIDE WORLD OF
MINERALS**



WIDE WORLD OF **MINERALS**

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SPORTS EDITION

- | | |
|----|------------------|
| 01 | SWIMMING |
| 02 | CYCLING |
| 03 | ATHLETICS |
| 04 | TENNIS |
| 05 | SNOW SPORTS |
| 06 | MOTOR SPORTS |
| 07 | SOCCER |
| 08 | GOLF |
| 09 | GYMNASTICS |
| 10 | E-SPORTS |
| 11 | FOOTBALL |
| 12 | OLYMPIC GAMES |
| 13 | PARALYMPIC GAMES |
| 14 | MOUNTAIN BIKING |
| 15 | WEIGHTLIFTING |
| 16 | ROLLER SPORTS |
| 17 | ROCK CLIMBING |
| 18 | CRICKET |
| 19 | WATER SPORTS |
| 20 | HORSE RACING |
| 21 | GRIDIRON |
| 22 | PRECISION SPORTS |
| 23 | MOTOCROSS |
| 24 | BASKETBALL |
| 25 | ICE SPORTS |
| 26 | BOBSLED |
| 27 | BASEBALL |
| 28 | YACHT RACING |
| 29 | SKY DIVING |
| 30 | COMBAT SPORTS |



WIDE WORLD OF MINERALS

Welcome to the *Wide World of Minerals*, where we shine the stadium lights on the mined minerals and metals that help to make the great sporting moments possible.



From the Matildas to the Renegades to the Rabbitohs, Australia is a great sporting nation. Our national spirit, team pride and sense of fair play are derived from the sports we play, the sports we watch and the teams we love to support.

In the year of the XXXIII Olympiad, world class athleticism and record breaking performances are brought to the fore, and broadcast around the world. From the nickel and aluminium in the Olympic torch to the silicon and cesium in precision timekeeping, to the gold, copper and rare earth elements in fitness trackers, it all starts with minerals.

The Paris Olympics and Paralympics were the first in our lifetimes with the ambition to be 'climate positive'. Organisers committed to offset more carbon emissions than the Games emit. Critical to achieving this was solar, wind and nuclear energy, battery storage and electric transport. France is ahead of the game when it comes to clean energy – 70 per cent of its electricity is already produced with zero emissions from nuclear energy.

Battery minerals like lithium, nickel and cobalt were equally important to meet this ambition, as were the workhorses of energy generation and steel making – copper, coal and iron ore. From the Hunter Valley to the Pilbara, Australia's world-class mining industry played a critical role in helping to deliver the world its first climate positive Games.

SPORTS EDITION

30 things

Miners are also some of the biggest financial contributors to the sports we love. From Hancock Prospecting, the nation's largest private benefactor of Olympic and Paralympic teams to BHP, helping create a genuinely level playing field for women's football and the AFLW, these major sponsorships run parallel to the industry's broader investments in community sports across Australia.

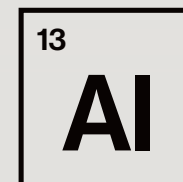
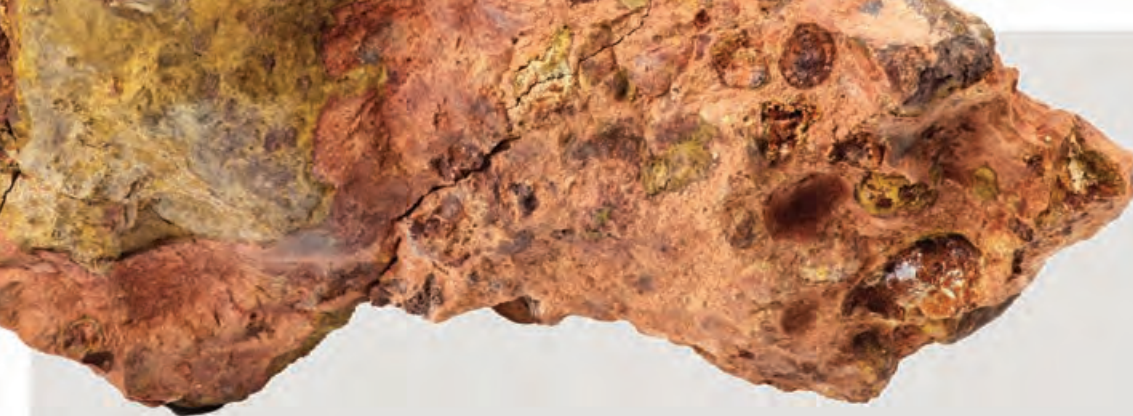
From mountain biking to horseback riding, junior netball to Little Athletics, miners invest millions of dollars every year in grassroots sports that foster inclusion and encourage education through participation, while at the same time unearthing the superstars of tomorrow. It's another reason why, year after year, mining finishes top of the podium as one of the nation's largest philanthropic industries.

So whether you're a spectator or an athlete, I hope the *Wide World of Minerals* ignites the sporting spirit in your household this year, next year and beyond.



Tania Constable
Chief Executive Officer
Minerals Council of Australia





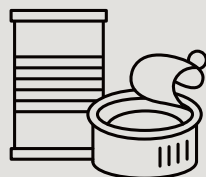
Aluminium

Aluminium

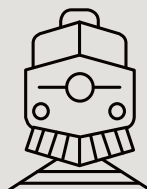
COMMON USES



Aircraft



Canned food



Public transport



Housing



Cookware



Bicycles

DID YOU KNOW?



Wrapped in aluminium

Life Savers and Toblerone chocolate bars were among the first commercial uses of aluminium foil. Swiss chocolatier Tobler began wrapping bars in rolled foil in 1911. In the United States, aluminium replaced tin foil Life Saver wrappers in 1925.



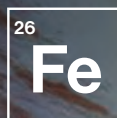
PROPERTIES

Symbol	Al
Atomic number	13
Atomic mass	26.98
Melting point	660°C
Electron configuration	[Ne] 3s ² 3p ¹

Swimming pool



Carbon



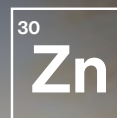
Iron



Manganese



Vanadium



Zinc



Copper



Silver



Zinc

Pool sanitation

Diving platform



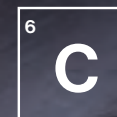
Aluminium



Chromium



Iron



Carbon

Starting blocks
(ladders,
handrails)

Robotic cleaners



Nickel



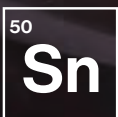
Copper



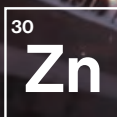
Nickel



Chromium



Tin



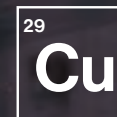
Zinc



Silicon



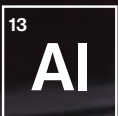
Gold



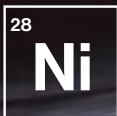
Copper

Touchpad sensors

Underwater cameras



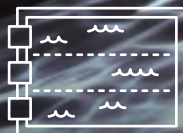
Aluminium



Nickel



Titanium



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Swimming became an Olympic sport in 1908, but women weren't allowed to compete until 1912. Australians Fanny Durack and Mina Wylie made history by winning gold and silver in the 100 metre freestyle.

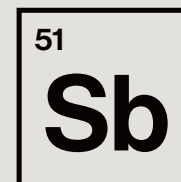
National Library of Australia

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SWIMMING

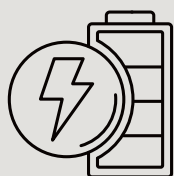
WIDE WORLD OF
MINERALS



Antimony

Antimony

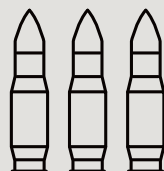
COMMON USES



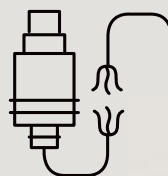
Batteries



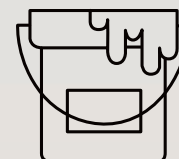
Fire retardant



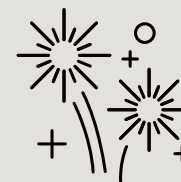
Ammunition



Cable sheathing



Paint



Fireworks

DID YOU KNOW?



The everlasting pill

Antimony was a popular remedy in the 19th century for the chronically constipated. Ingested as a small metal ball, it became known as the everlasting pill and would be collected and reused, sometimes passed down through generations.



PROPERTIES

Symbol	Sb
Atomic number	51
Atomic mass	121.76
Melting point	630°C
Electron configuration	[Kr]4d ¹⁰ 5s ² 5p ³



²⁶ Fe Iron	⁶ C Carbon	²⁸ Ni Nickel	¹³ Al Aluminium	²² Ti Titanium	²⁴ Cr Chromium
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Road racing
bicycles



¹³ Al Aluminium	³ Li Lithium	³¹ Ga Gallium	⁶⁰ Nd Neodymium	⁴⁶ Pd Palladium
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Cycling
computer

02 CYCLING

Medical support
& imaging truck

⁴ Be Beryllium	⁸² Pb Lead
--	------------------------------------

⁵⁶ Ba Barium	⁷⁴ W Tungsten
--------------------------------------	---------------------------------------

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²⁶ Fe Iron	²⁹ Cu Copper	³ Li Lithium	²⁸ Ni Nickel	²⁷ Co Cobalt
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Support cars
(EVs or hybrid)

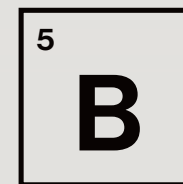
⁷⁹ Au Gold	¹⁴ Si Silicon	⁴⁷ Ag Silver	³ Li Lithium
------------------------------------	---------------------------------------	--------------------------------------	--------------------------------------

Micro cameras
(helmet-mounted)



The Tour de France began in 1903, founded by sports newspaper *L'Auto* to boost flagging sales. Today the endurance race is among the world's most watched sporting events, after the Olympics.

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Boron

Boron

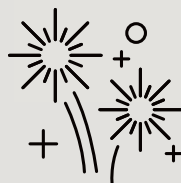
COMMON USES



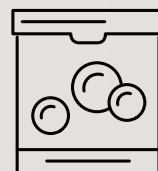
Tile glazes



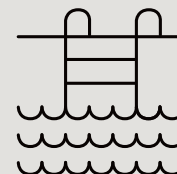
Rocket propellant



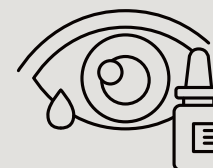
Fireworks



Washing powder



Pool cleaner



Eye drops

DID YOU KNOW?



The artisan's compound

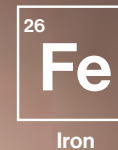
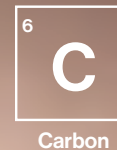
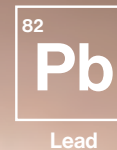
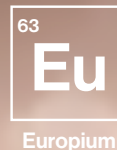
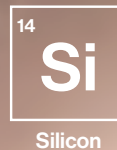
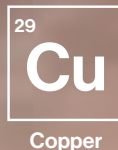
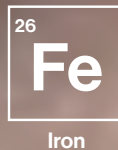
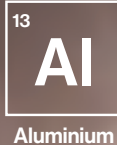
Boron compounds have been used for thousands of years. Borax, a composite of boron, sodium, oxygen and water, was mined from salt lakes in Tibet and Kashmir as early as 2000 B.C. It was used by gold and silversmiths and pottery makers.



PROPERTIES

Symbol	B
Atomic number	5
Atomic mass	10.81
Melting point	2076°C
Electron configuration	[He] 2s ² 2p ¹

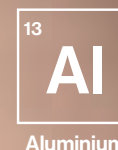
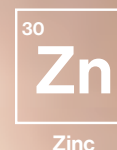
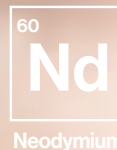
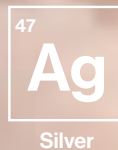
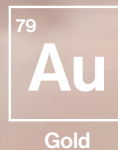
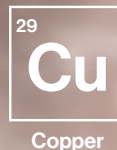
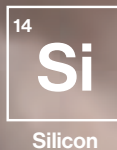
Starting pistol
(electronic)



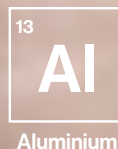
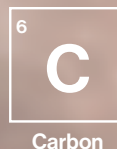
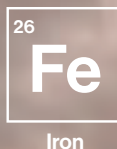
Track & field
(inc. shot put,
discus, javelin,
hammerhead)



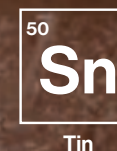
Lasers
(inc. finish line,
alignment and
visual aids)



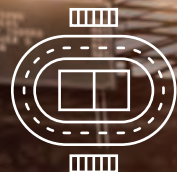
Starting
block



VDM cameras
(Video distance measurement)



VDM cameras can capture up
to 2000 frames per second for
precision distance measurements
in sports like long jump. Television
broadcast cameras can capture
30 to 60 frames per second.

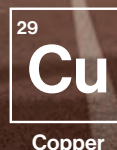


03

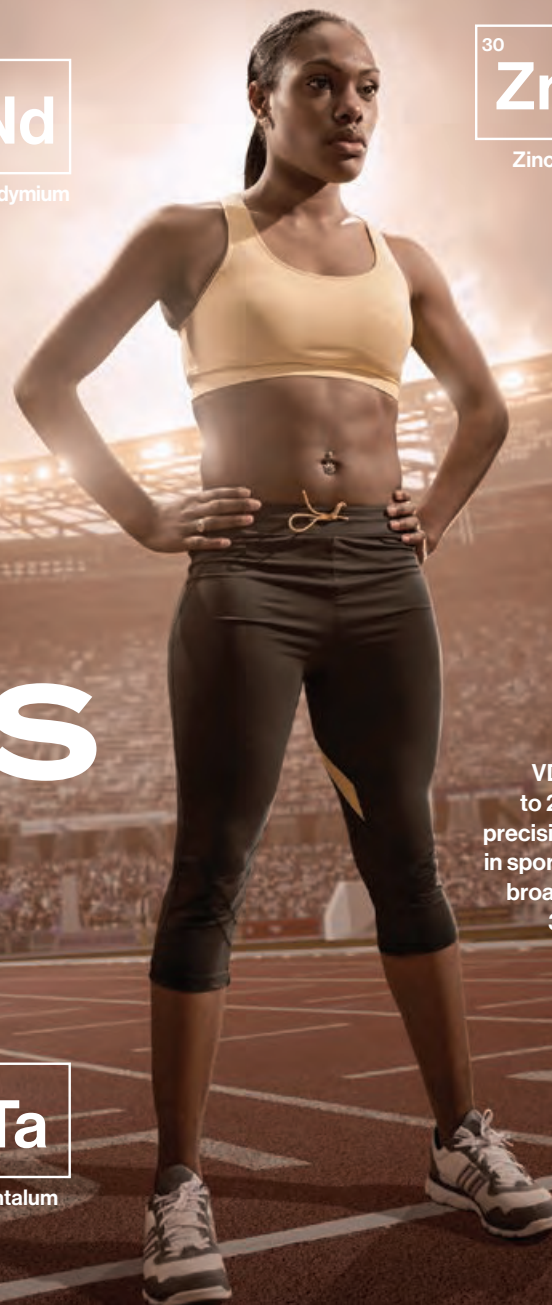
ATHLETICS

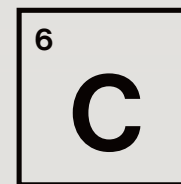
WIDE WORLD OF
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Biometric
sportswear



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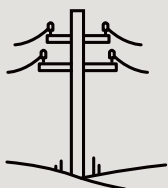




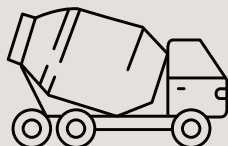
Carbon

Carbon

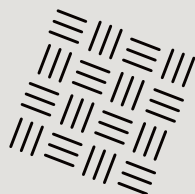
COMMON USES



Electricity



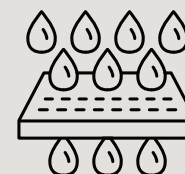
Cement



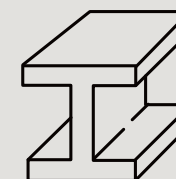
Carbon fibre



Wind turbines

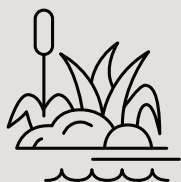


Water filtration



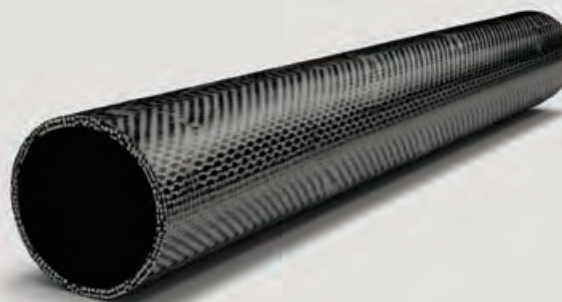
Steel

DID YOU KNOW?



Giant swamp plants

The energy we get from coal today comes from giant swamp plants that lived before the dinosaurs. Sound far-fetched? All living plants store solar energy. Coal is the product of decaying plant matter that millions of years ago locked in this energy.



PROPERTIES

Symbol	C
Atomic number	6
Atomic mass	12.01
Melting point	3,550°C
Electron configuration	[He] 2s ² 2p ²

Tennis racquet

6 C Carbon	13 Al Aluminium	22 Ti Titanium	74 W Tungsten
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40 Zr Zirconium	32 Ge Germanium	14 Si Silicon	29 Cu Copper	22 Ti Titanium
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Ball speed sensors

Electronic umpire (Hawk-Eye)

14 Si Silicon	29 Cu Copper	79 Au Gold	47 Ag Silver	39 Y Yttrium
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In a Grand Slam first, the Australian Open launched a real time, parallel tournament in the metaverse in 2022, and its own AO ArtBall NFT collection.

Tennis Australia



04 TENNIS

WIDE WORLD OF MINERALS



Hard courts

26 Fe Iron	6 C Carbon	28 Ni Nickel	25 Mn Manganese	30 Zn Zinc
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Perimeter displays (LED screens)

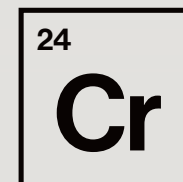
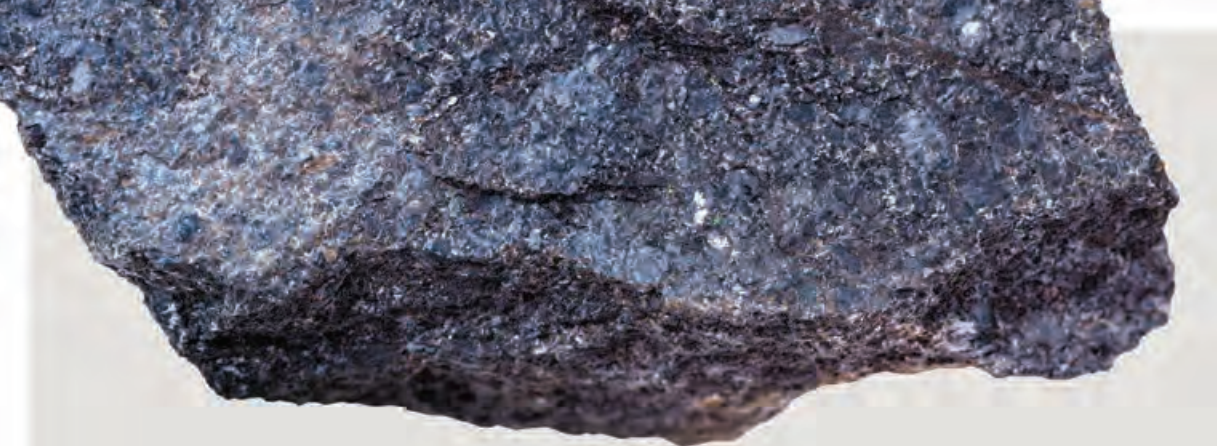
50 Sn Tin	49 In Indium	63 Eu Europium	64 Gd Gadolinium	39 Y Yttrium
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Stadium

26 Fe Iron	6 C Carbon
24 Cr Chromium	42 Mo Molybdenum
25 Mn Manganese	23 V Vanadium



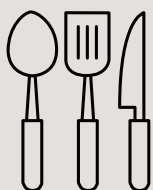
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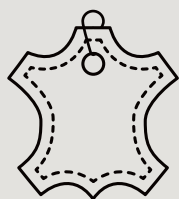
Chromium

Chromium

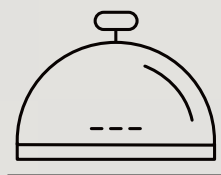
COMMON USES



Utensils



Leather tanning



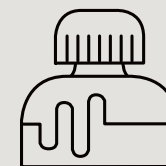
Chrome plating



Wood preservation

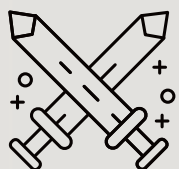


Fireworks



Dyes & inks

DID YOU KNOW?



Chromium-tipped swords

Chrome plating might be synonymous with the modern era, but it was also used as early as the Qin Dynasty in China. Archaeologists discovered swords tipped with chromium oxide during the unearthing of the Terracotta Army in the 1970s.



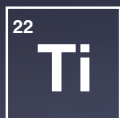
PROPERTIES

Symbol	Cr
Atomic number	24
Atomic mass	51.9961
Melting point	1,890°C
Electron configuration	[Ar] 3d ⁵ 4s ¹

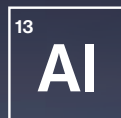
Snow goggles
(glare control
lenses)



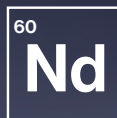
Iridium



Titanium



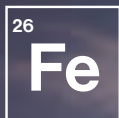
Aluminium



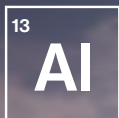
Neodymium



Snowboard &
ski bindings



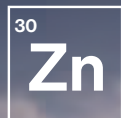
Iron



Aluminium

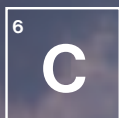


Titanium

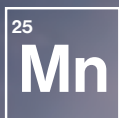


Zinc

Ramps &
jumps



Carbon

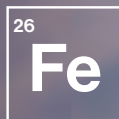


Manganese



Vanadium

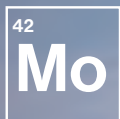
Chairlift



Iron



Aluminium

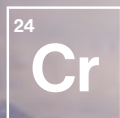


Molybdenum

Skis & ski poles
(edges & fixtures)



Nickel



Chromium



Manganese



Aluminium



EPIRB
(Emergency
position indicating
radio beacon)



Silicon



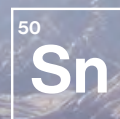
Lithium



Copper



Gold



Tin

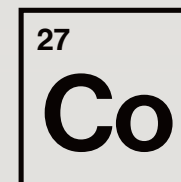
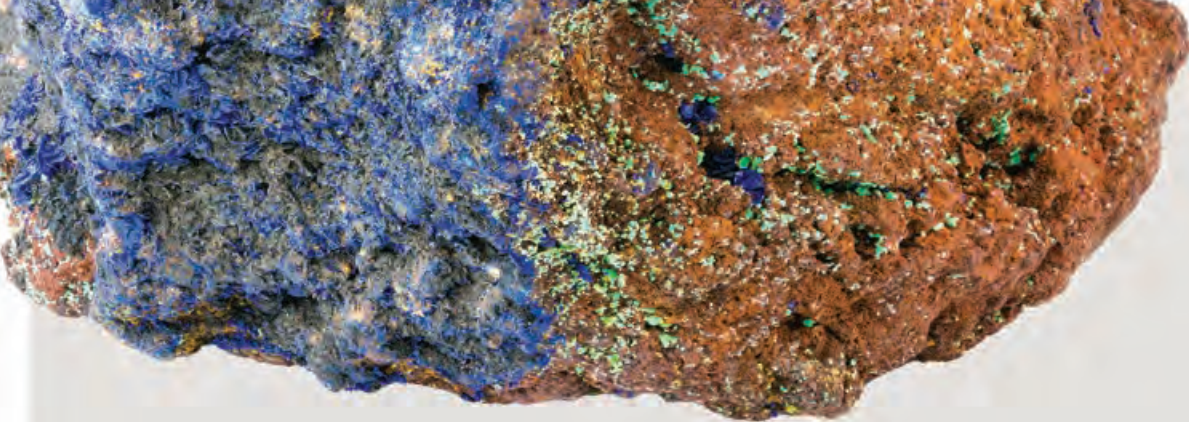
05 SNOW SPORTS

WIDE WORLD OF
MINERALS



The 'Snurfer' was the precursor to the modern snowboard, invented in 1965 by Michigan engineer Sherman Poppen who bolted two skis together to make a snow surfboard.

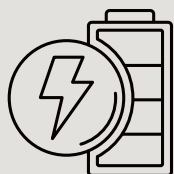
Resourcing tomorrow
**Australian
Mining**
minerals.org.au



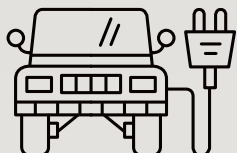
Cobalt

Cobalt

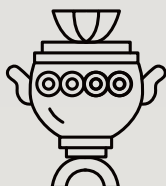
COMMON USES



Batteries



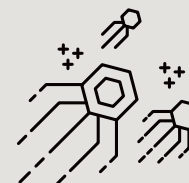
Electric cars



Ceramics



Wind turbines



Medical tracer



Jet engines

DID YOU KNOW?



From pigment to superalloy

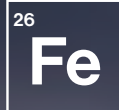
Cobalt has provided the striking blue pigment used by potters and artisans to colour their wares for centuries. Today the indispensable metal is also used to make rechargeable batteries, such as those in EVs and smartphones, and as a critical superalloy in aerospace and defence industries.



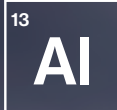
PROPERTIES

Symbol	Co
Atomic number	27
Atomic mass	58.93
Melting point	1,495°C
Electron configuration	[Ar] 3d ⁷ 4s ²

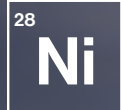
Formula 1
engines



Iron



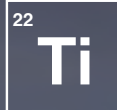
Aluminium



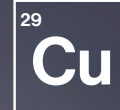
Nickel



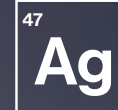
Cobalt



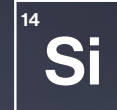
Titanium



Copper



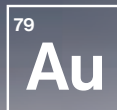
Silver



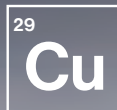
Silicon

Biometric
gloves

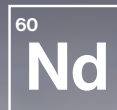
Cockpit comms
(two-way radio)



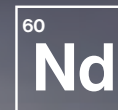
Gold



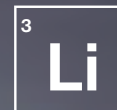
Copper



Neodymium

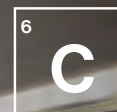


Neodymium



Lithium

Pit wall
(mission control)



Carbon



Silicon



Titanium



Copper



Titanium

Halo bar
(driver
protection)

06 MOTOR SPORTS

WIDE WORLD OF
MINERALS



Onboard
cameras



Silicon



Cerium



Gold

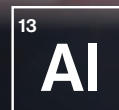


Germanium

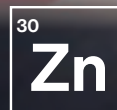


Yttrium

Flame
retardants



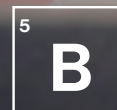
Aluminium



Zinc



Magnesium



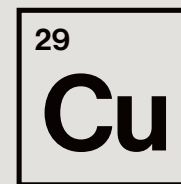
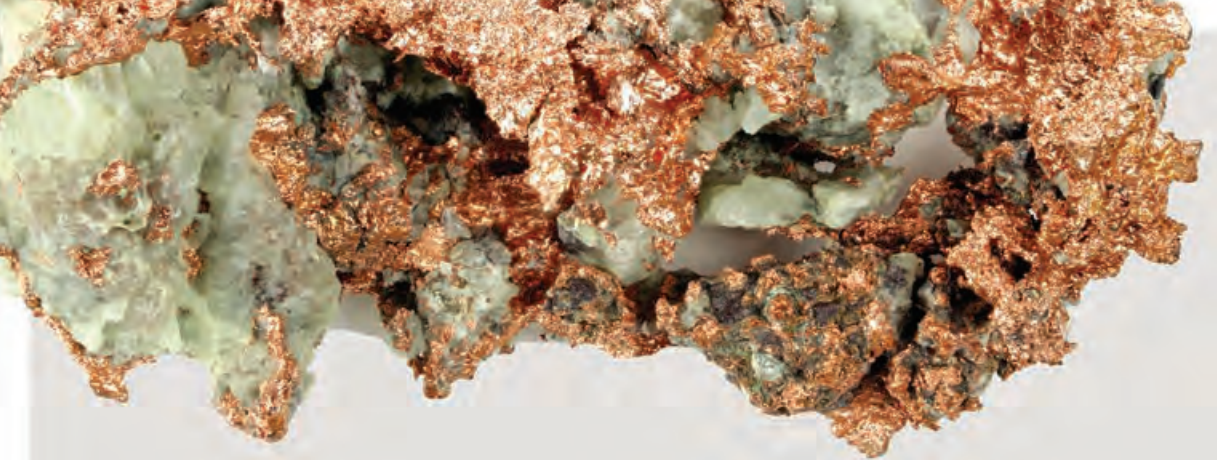
Boron



Sewerage covers on the Monaco
Grand Prix street circuit are welded
closed to prevent lifting caused by
F1 racecar downforces.

autosport.com

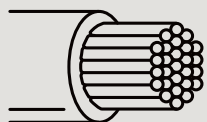
Resourcing tomorrow
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Mining**
minerals.org.au



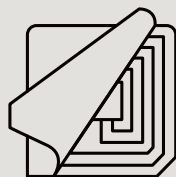
Copper

Copper

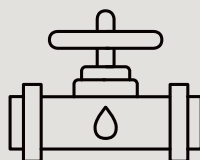
COMMON USES



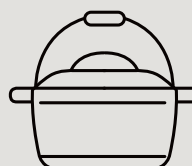
Electrical wiring



Circuit board



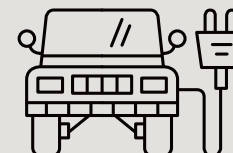
Plumbing



Homewares

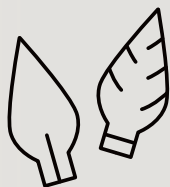


Instruments



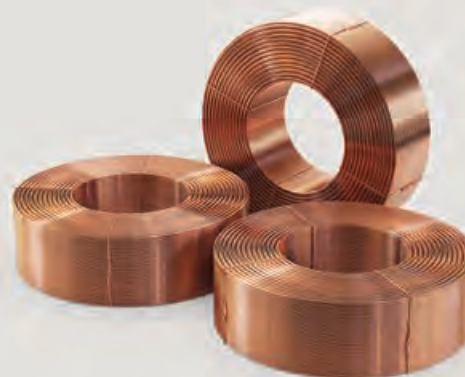
Electric cars

DID YOU KNOW?



Humankind's oldest metal

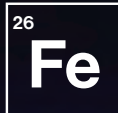
Copper is considered to be humankind's oldest metal. It is thought that Neolithic communities used copper as an alternative to stone tools during 8000 B.C. Ancient Egyptians believed copper was sacred and gave its wearer magical powers.



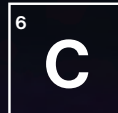
PROPERTIES

Symbol	Cu
Atomic number	29
Atomic mass	63.55
Melting point	1,083°C
Electron configuration	[Ar] 3d ¹⁰ 4s ¹

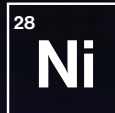
Soccer stadium



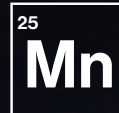
Iron



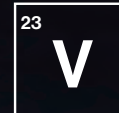
Carbon



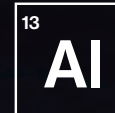
Nickel



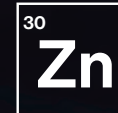
Manganese



Vanadium



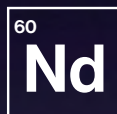
Aluminium



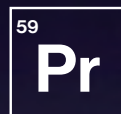
Zinc

Soccer goals

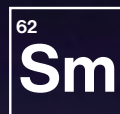
Commentary box



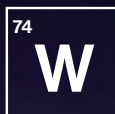
Neodymium



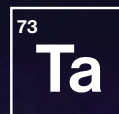
Praseodymium



Samarium



Tungsten



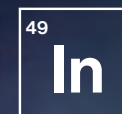
Tantalum



Stadium tower lights (LED)



Gallium



Indium



Lanthanum



Cerium

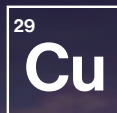


Europium

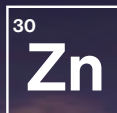


Terbium

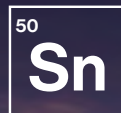
Referee's whistle



Copper



Zinc



Tin

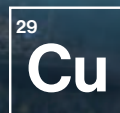


Often thought an Americanism, the name 'soccer' actually originated from aristocratic English boys in the 1880s who used the terms 'rugger' and 'soccer' to differentiate between rugby football and association football.

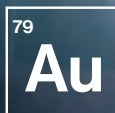
Britannica.com

Resourcing tomorrow
Australian Mining
minerals.org.au

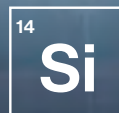
Replay cameras



Copper



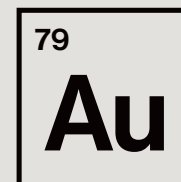
Gold



Silicon

07 SOCCER

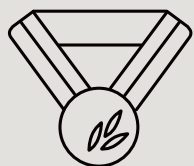
WIDE WORLD OF
MINERALS



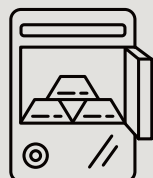
Gold

Gold

COMMON USES



Awards



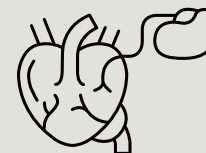
Investment



Electronics



Jewellery

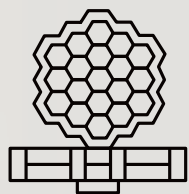


Advanced health



Aerospace

DID YOU KNOW?



James Webb Telescope

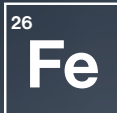
NASA's James Webb Space Telescope is equipped with 18 gold-coated hexagonal mirrors that reflect infrared light to observe the earliest formation of stars and search for exoplanets. It is so sensitive to infrared light it can detect the heat signature of a bumblebee at the distance of the moon.



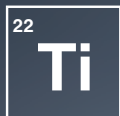
PROPERTIES

Symbol	Au
Atomic number	79
Atomic mass	196.97
Melting point	1,064°C
Electron configuration	[Xe] 4f ¹⁴ 5d ¹⁰ 6s ¹

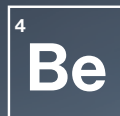
Golf clubs



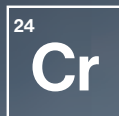
Iron



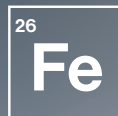
Titanium



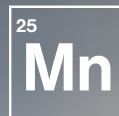
Beryllium



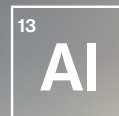
Chromium



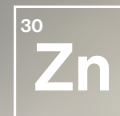
Iron



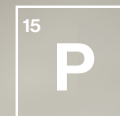
Manganese



Aluminium



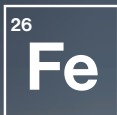
Zinc



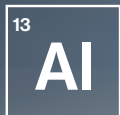
Phosphorus

Course irrigation

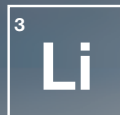
Electric golf cart



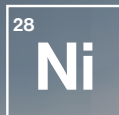
Iron



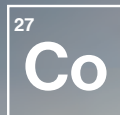
Aluminium



Lithium



Nickel



Cobalt



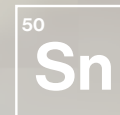
Gold



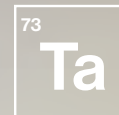
Lithium



Copper

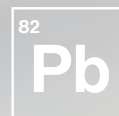


Tin



Tantalum

Digital scoring



Lead



Tungsten



Titanium

Club weight adjusters

Laser rangefinder



Silicon



Copper



Cerium



Neodymium



Dysprosium

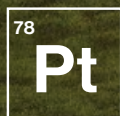


Yttrium

Tournament trophies



Silver



Platinum



Augusta National Golf Club is a stickler for its rules and customs, a long list which includes no running, no mobile phones, no cameras, no verbal outbursts, no coolers, no sitting on the grass...
masters.com



08
GOLF

WIDE WORLD OF
MINERALS

Resourcing tomorrow
Australian Mining
minerals.org.au



Indium

Indium

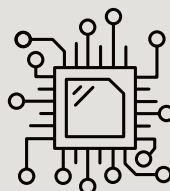
COMMON USES



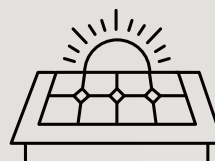
Touchscreens



Protective eyewear



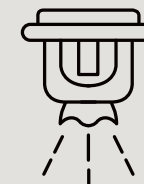
Microchips



Solar panels



LCD televisions



Fire sprinklers

DID YOU KNOW?



Cut with a knife

After a century of near obscurity, Indium is having its moment. Indium tin oxide is the material used for touch and flat screen tech and solar panels. Soft enough to cut with a knife, indium is also notable for the high pitched 'cry' it gives off when bent.



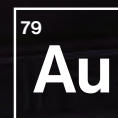
PROPERTIES

Symbol	In
Atomic number	49
Atomic mass	114.82
Melting point	156.6°C
Electron configuration	[Kr] 4d ¹⁰ 5s ² 5p ¹

09 GYMNASTICS



WIDE WORLD OF
MINERALS



Gold



Copper



Silicon



Lithium



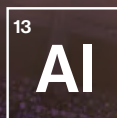
Gallium

Electronic
scoreboard

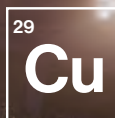


Alexander the Great and his Macedonian soldiers used an early pommel horse as far back as 315 BC to practice mounting and dismounting their battle horses quickly.

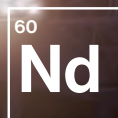
Performance
music



Aluminium



Copper



Neodymium



Magnesium

Apparatus
(uneven bars,
balance beam,
vault etc)



Iron



Carbon



Aluminium



Iron



Carbon



Manganese

Sprung
floor

Force
plates



Aluminium



Gold



Silicon



Copper



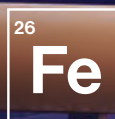
Magnesium



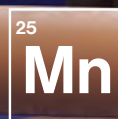
Zinc

Chalk

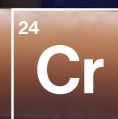
Trampoline
springs



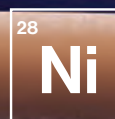
Iron



Manganese



Chromium



Nickel



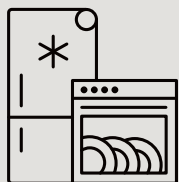
Resourcing tomorrow
**Australian
Mining**
minerals.org.au



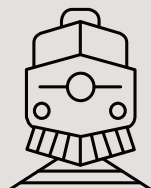
Iron

Iron

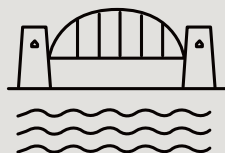
COMMON USES



White goods



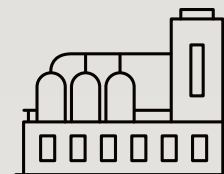
Public transport



Roads & bridges



Cities

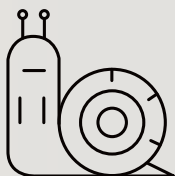


Manufacturing



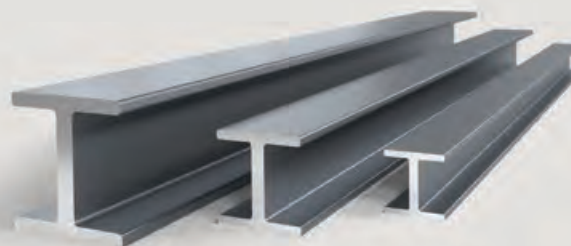
Cars & trucks

DID YOU KNOW?



Armoured snails

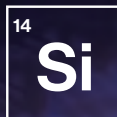
A deep-sea snail has evolved a suit of armour made from iron sulfide – the only animal on earth that uses iron in this way. The scaly-foot gastropod was discovered in 2001 and lives in the hydrothermal vent fields of the Indian Ocean.



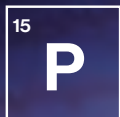
PROPERTIES

Symbol	Fe
Atomic number	26
Atomic mass	55.85
Melting point	1,538°C
Electron configuration	[Ar] 3d ⁶ 4s ²

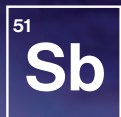
Computer processors



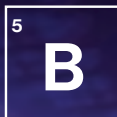
Silicon



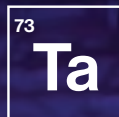
Phosphorus



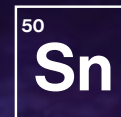
Antimony



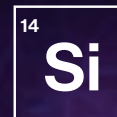
Boron



Tantalum



Tin



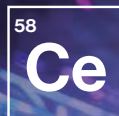
Silicon



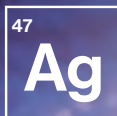
Europium

4K LCD monitors

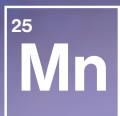
Immersive headsets



Cerium



Silver



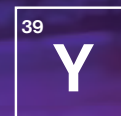
Manganese



Lithium



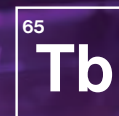
Cobalt



Yttrium

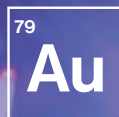


Indium

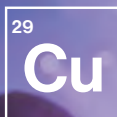


Terbium

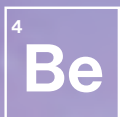
Gaming consoles



Gold



Copper



Beryllium

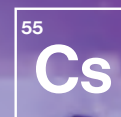
Mechanical keyboard



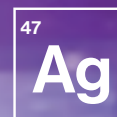
Aluminium



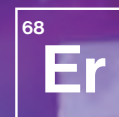
Lead



Cesium



Silver



Erbium

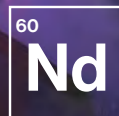
5G network

Stanford University hosted the first e-sports event in 1972 – the prize a 1-year subscription to *Rolling Stone*. The market value today of e-sports is more than A\$200 billion. Fortune Business Insights



10 E-SPORTS

WIDE WORLD OF
MINERALS



Neodymium

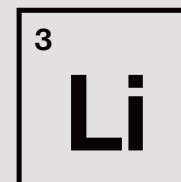


Dysprosium



External hard drives

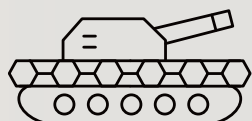
Resourcing tomorrow
Australian Mining
minerals.org.au



Lithium

Lithium

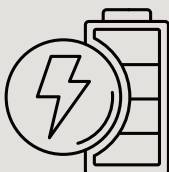
COMMON USES



Armour plate



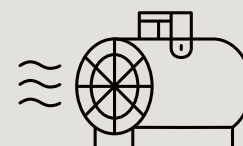
Lubricant



Batteries



Mental health



Industrial drying



Pacemaker

DID YOU KNOW?



Medicinal power of lithium

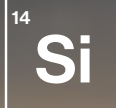
An Australian POW discovered the medicinal power of lithium in 1949. Dr John Cade survived three and a half years in Changi before returning to his work in Australia, where he successfully treated patients after noting the calming effects on guinea pigs.



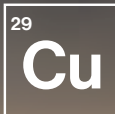
PROPERTIES

Symbol	Li
Atomic number	3
Atomic mass	6.94
Melting point	180°C
Electron configuration	[He] 2s ¹

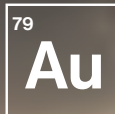
Ball-tracking
sensors



Silicon



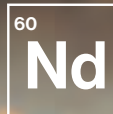
Copper



Gold



Lithium



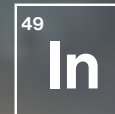
Neodymium



Copper



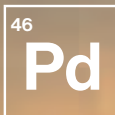
Silver



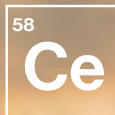
Indium

GPS
tracker
player
vests

Pre-game
entertainment



Palladium



Cerium



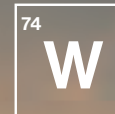
Potassium



Aluminium



Lithium



Tungsten



11

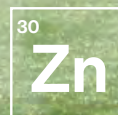
FOOTBALL

WIDE WORLD OF
MINERALS

Field
graphics
(pigment)



Titanium



Zinc

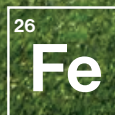


Gold



Live
broadcasts

Sports
stadium



Iron



Carbon

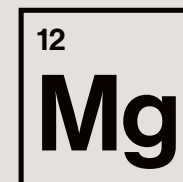


Tungsten



Nickel

Resourcing tomorrow
**Australian
Mining**
minerals.org.au



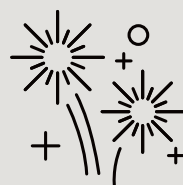
Magnesium

Magnesium

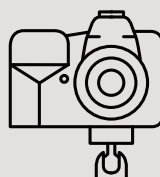
COMMON USES



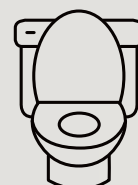
Aircraft



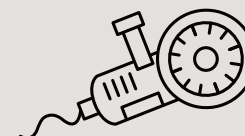
Fireworks



Cameras



Laxatives

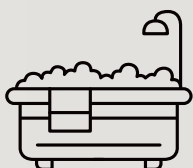


Power tools



Racecars

DID YOU KNOW?



Salve for weary bones

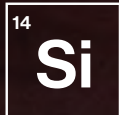
Epsom Salts originated from natural springs discovered in 1618 by cow-herd Henry Wicker in Epsom, England. The water's healing properties led physician and botanist Nehemiah Grew to extract the magnesium sulfate for medicinal purposes in 1695.



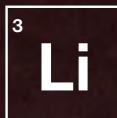
PROPERTIES

Symbol	Mg
Atomic number	12
Atomic mass	24.31
Melting point	650°C
Electron configuration	[Ne] 3s ²

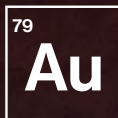
Timekeeping
systems



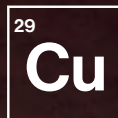
Silicon



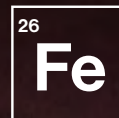
Lithium



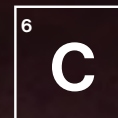
Gold



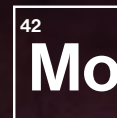
Copper



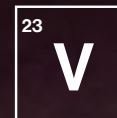
Iron



Carbon



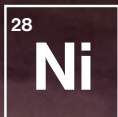
Molybdenum



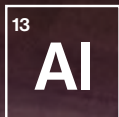
Vanadium

Gymnastics
(sprung floor)

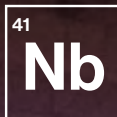
Olympic torch
(Paris 2024)



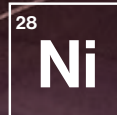
Nickel



Aluminium



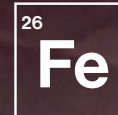
Niobium



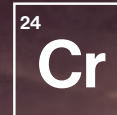
Nickel



Manganese



Iron



Chromium



Molybdenum

Olympic
cauldron



Uranium

Electricity
generation
in France
(nuclear)



Paris 2024 Olympics medallists
were awarded medals containing an
original iron fragment from the Eiffel
Tower, which opened in 1889.
paris2024.org

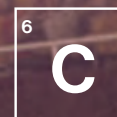
12

OLYMPIC GAMES

WIDE WORLD OF
MINERALS

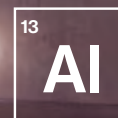


Iron

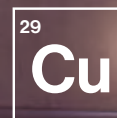


Carbon

Track & field
(inc. starting
blocks, javelin,
shot put, high
jump etc)



Aluminium

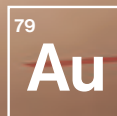


Copper



Zinc

Olympic
medals



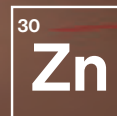
Gold



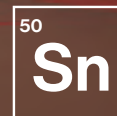
Silver



Copper



Zinc

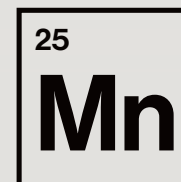


Tin

Bronze



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**Australian
Mining**
minerals.org.au



Manganese

Manganese

COMMON USES



Magnets



Deoxidiser



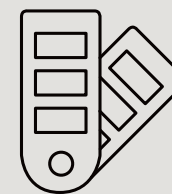
Fertiliser



Animal feed



Steel



Colourant

DID YOU KNOW?



Restoring balance

Manganese is important for good health and exists in some of the foods we eat. Too much environmental manganese can have a negative impact however, causing body tremors, aggression and delusions known as 'manganese madness'.



PROPERTIES

Symbol	Mn
Atomic number	25
Atomic mass	54.94
Melting point	1,246°C
Electron configuration	[Ar] 3d ⁵ 4s ²

Athlete's
village



Iron Carbon Manganese



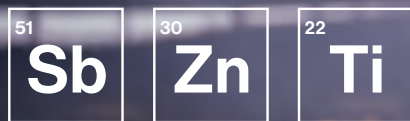
Vanadium Zinc



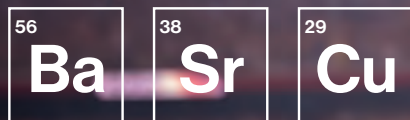
Paralympic history began in 1948 at a military hospital near London's Olympic Games when neurologist Sir Ludwig Guttman organised a series of sporting events to speed up the recovery of WW2 paraplegic veterans.

Paris2024.org

Closing ceremony
(fireworks)



Antimony Zinc Titanium



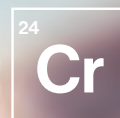
Barium Strontium Copper



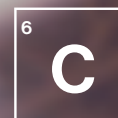
Aluminium



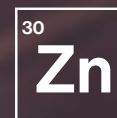
Titanium



Chromium

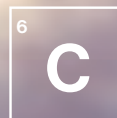


Carbon

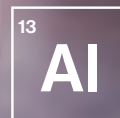


Zinc

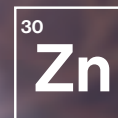
Wheelchair
basketball
(wheelchair)



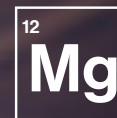
Carbon



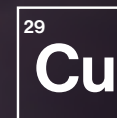
Aluminium



Zinc

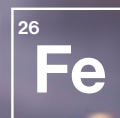


Magnesium

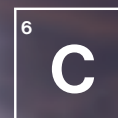


Copper

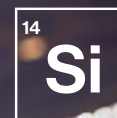
Para
archery
(bow, arrows,
sights)



Iron



Carbon



Silicon



Manganese

Para
powerlifting
(cast iron
discs/plates)



13



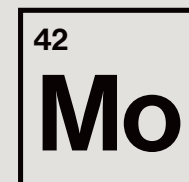
PARALYMPIC
GAMES



WIDE WORLD OF
MINERALS

Resourcing tomorrow
**Australian
Mining**
minerals.org.au

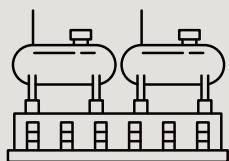




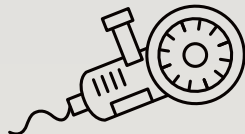
Molybdenum

Molybdenum

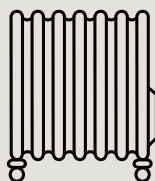
COMMON USES



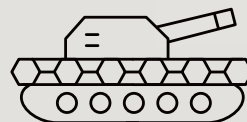
Petrol refining



Saw blades



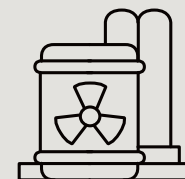
Heaters



Armour plating



High rises



Nuclear reactors

DID YOU KNOW?



Fighting crime

Molybdenum gives steel strength, but did you also know it is an important crime fighter? Some fingerprint powders contain molybdenum. Combined with other chemicals, the powder works by adhering to the oil and moisture of a latent print.



PROPERTIES

Symbol	Mo
Atomic number	42
Atomic mass	95.95
Melting point	2,623°C
Electron configuration	[Kr] 4d ⁵ 5s ¹

14 MOUNTAIN BIKING

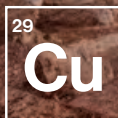
WIDE WORLD OF
MINERALS



First aid kit
(inc. scissors,
antimicrobial pads,
tweezers, bandage
fasteners)



Iron



Copper

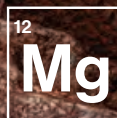


Silver

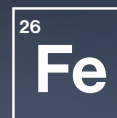
**Electrolyte
drinks**



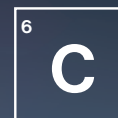
Potassium



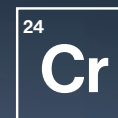
Magnesium



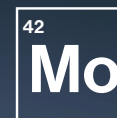
Iron



Carbon

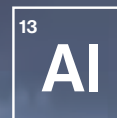


Chromium

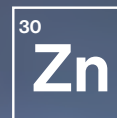


Molybdenum

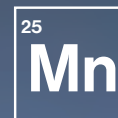
Bike frame
(chromoly
steel)



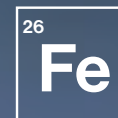
Aluminium



Zinc



Manganese

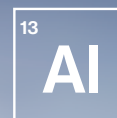


Iron

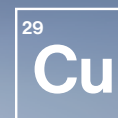


Nickel

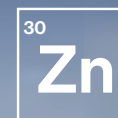
Repair kit
(inc. spokes,
valves, chains)



Aluminium



Copper

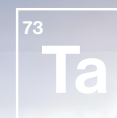


Zinc

**Pressure
gauge**



Gold



Tantalum

**GPS
navigation
unit**



Tin



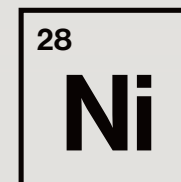
Tungsten



The greatest vertical descent on
a mountain bike in 24 hours is 40,840.5
metres, a 2018 world record jointly held by
two Germans, Kabbani and Schweika.

Guinness World Records

Resourcing tomorrow
**Australian
Mining**
minerals.org.au



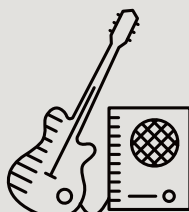
Nickel

Nickel

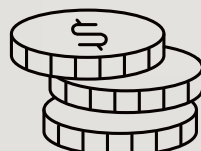
COMMON USES



Food processing



Guitar strings



Coins



Marine engineering

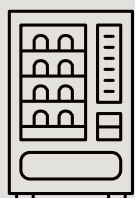


Electronics



Kitchen sink

DID YOU KNOW?



A nickel for a coke

A bottle of Coca-Cola could be bought for a nickel in the United States between 1885 until well into the 1950s. The company was committed to the fixed five cent price, largely because its vending machines only accepted nickels.



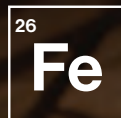
PROPERTIES

Symbol	Ni
Atomic number	28
Atomic mass	58.69
Melting point	1,453°C
Electron configuration	[Ar] 3d ⁸ 4s ²

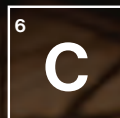
15 WEIGHT LIFTING

WIDE WORLD OF
MINERALS

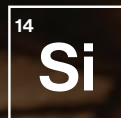
Weights
(Kettlebell, barbell,
dumbbell & plates)



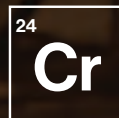
Iron



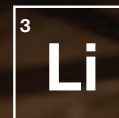
Carbon



Silicon



Chromium



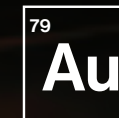
Lithium



Nickel



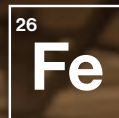
Cobalt



Gold

Massage
gun

Rowers
(Ergometer)



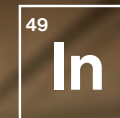
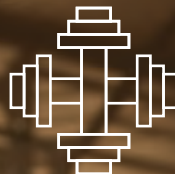
Iron



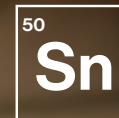
Nickel



Aluminium



Indium

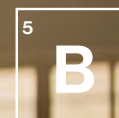


Tin



Silver

Countdown
clock



Boron



Yttrium

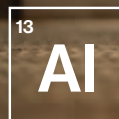


Icelandic actor and strongman
Hafþór Júlíus (Thor) Björnsson, who
played The Mountain in *Game of Thrones*,
lifted 501 kg to achieve the world's
heaviest deadlift in 2020.

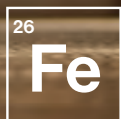
Guinness World Records



**Certified
scales**



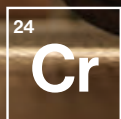
Aluminium



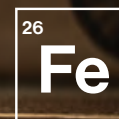
Iron



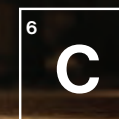
Nickel



Chromium



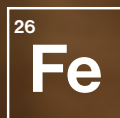
Iron



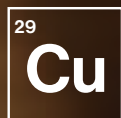
Carbon

Barbell
jack

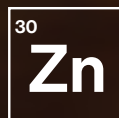
**Championship
belt**



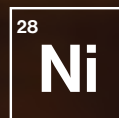
Iron



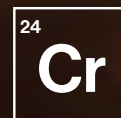
Copper



Zinc



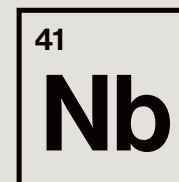
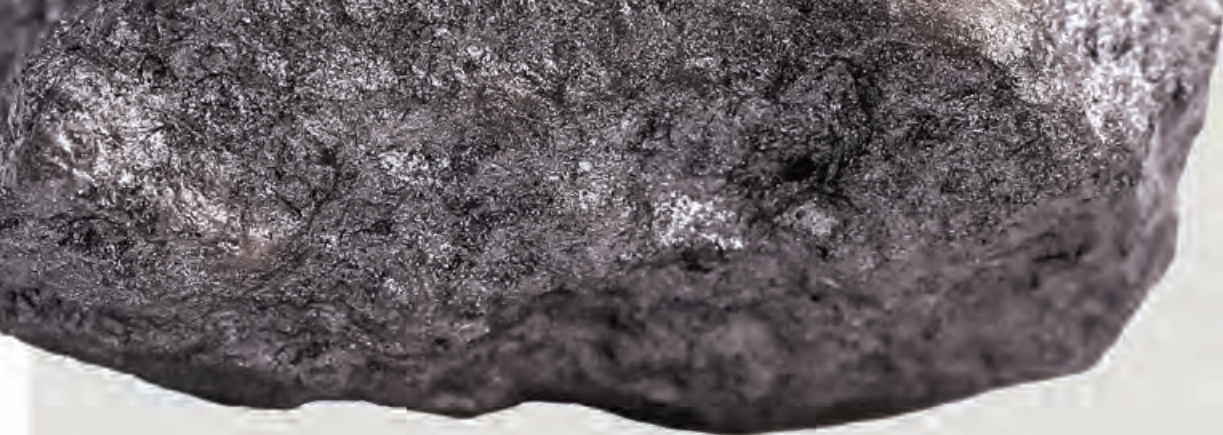
Nickel



Chromium



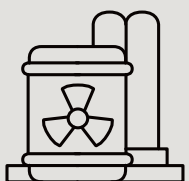
Resourcing tomorrow
**Australian
Mining**
minerals.org.au



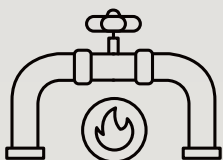
Niobium

Niobium

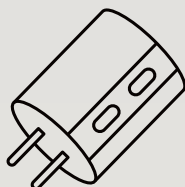
COMMON USES



Nuclear energy



Gas pipelines



Capacitors



Particle accelerators



Spacecraft



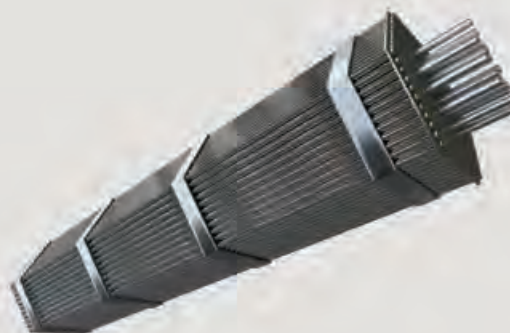
MRI scanners

DID YOU KNOW?



From the Gods

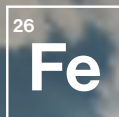
Niobium got its name from Niobe, the Greek goddess of tears. Niobe was also the daughter of King Tantalus, who inspired the name for another element, tantalum. In nature, niobium and tantalum are almost always found side by side.



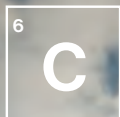
PROPERTIES

Symbol	Nb
Atomic number	41
Atomic mass	92.91
Melting point	2,477°C
Electron configuration	[Kr] 4d ⁴ 5s ¹

Skateboard
(trucks, bearings,
hardware)



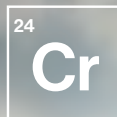
Iron



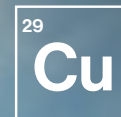
Carbon



Nickel



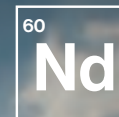
Chromium



Copper



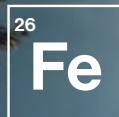
Gold



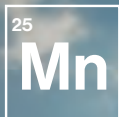
Neodymium

Mounted
camera

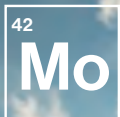
Half pipes,
ramps & rails



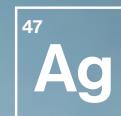
Iron



Manganese



Molybdenum



Silver

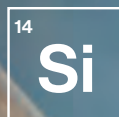


Lithium

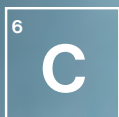


Cobalt

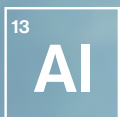
Grip tape



Silicon



Carbon



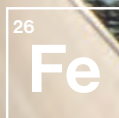
Aluminium



Inline skates
(frames, axles,
bearings)



Aluminium



Iron



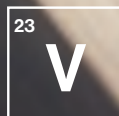
Nickel



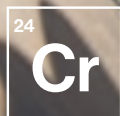
Titanium



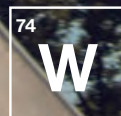
Spare
parts kit



Vanadium



Chromium

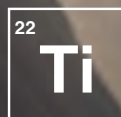


Tungsten

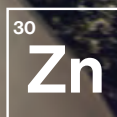


Molybdenum

Sunscreen



Titanium



Zinc



Magnesium

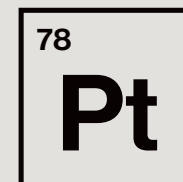
Tony Hawk's Pro Skater video games introduced skateboarding and skate culture to a global audience in 1999 – and the sport is still growing in popularity. Its market value is expected to reach US\$4.16 billion by 2030.

[Researchandmarkets.com](https://www.researchandmarkets.com)

16 ROLLER SPORTS

WIDE WORLD OF
MINERALS

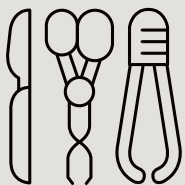
Resourcing tomorrow
**Australian
Mining**
minerals.org.au



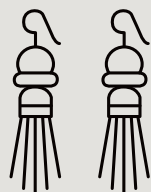
Platinum

Platinum

COMMON USES



Surgical tools



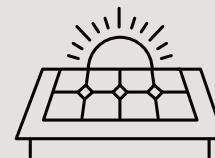
Jewellery



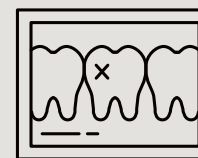
Catalytic converters



Polish

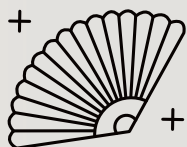


Solar panels



Dentistry

DID YOU KNOW?



By another name

Platinum is among the most prized metals in the world, both rarer and more expensive than gold. It does not oxidize and is a good electrical conductor. When the Spaniards first found the grey-white metal in Colombia in the 18th century they named it 'platina', which means 'little silver'.

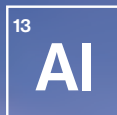


PROPERTIES

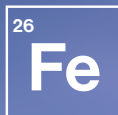
Symbol	Pt
Atomic number	78
Atomic mass	195.08
Melting point	1,768°C
Electron configuration	[Xe]4f ¹⁴ 5d ⁹ 6s ¹



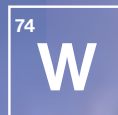
Belay
(braking device)



Aluminium



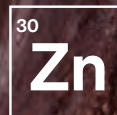
Iron



Tungsten



Copper



Zinc



Iron



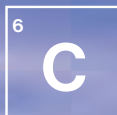
Carbon



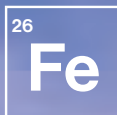
Nickel

Climbing wall
(indoor)

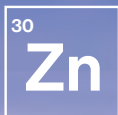
Harness &
climbing chalk



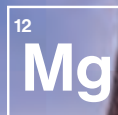
Carbon



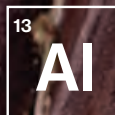
Iron



Zinc



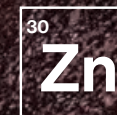
Magnesium



Aluminium



Chromium

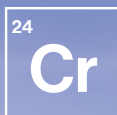


Zinc

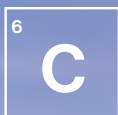
Water bottle
(stainless steel)



Nickel



Chromium



Carbon

The first documented rock climb dates back to France, 1492. Antoine de Ville ascended a 1000-foot peak on the orders of King Charles VIII using ladders and grappling hooks – techniques developed for sieging castles.



EPIRB

(Emergency position indicating
radio beacon)



Silicon



Copper



Gold



Tin



Lithium



Cobalt



Sunscreen



Titanium



Zinc

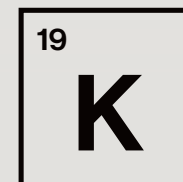
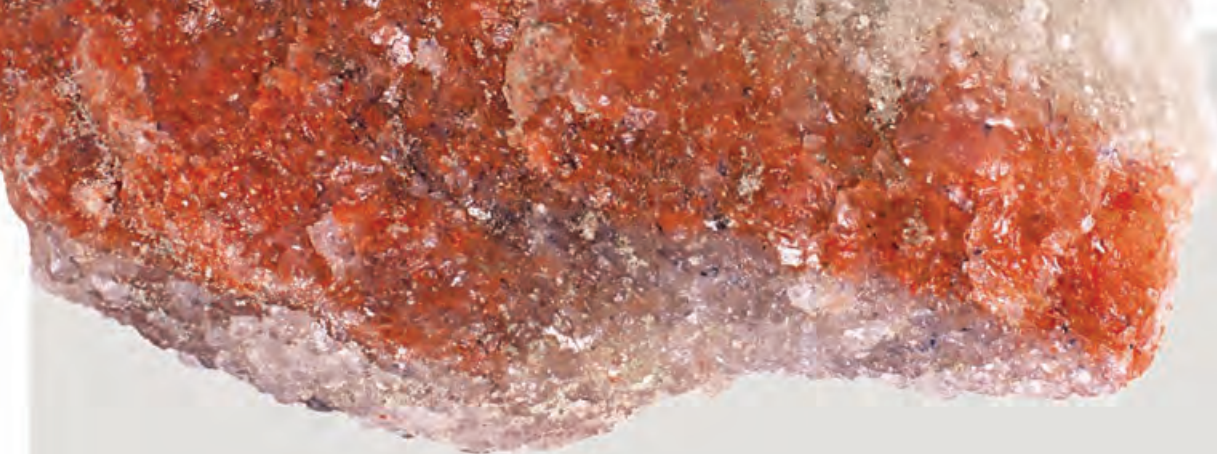


Magnesium

17 ROCK CLIMBING

WIDE WORLD OF
MINERALS

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Potassium

Potassium

COMMON USES



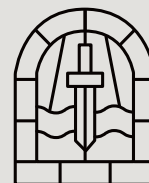
Fertiliser



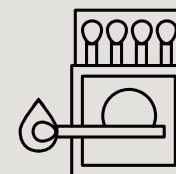
Detergents



Salt substitute



Glass



Match heads



Saline drip

DID YOU KNOW?



Loaded with potassium

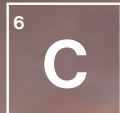
Potassium is vital to good health and at the same time, radioactive. Loaded with potassium, bananas are among the most radioactive foods. Background radiation has been with us since the earth formed. Small amounts are not harmful to humans.



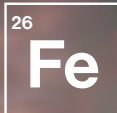
PROPERTIES

Symbol	K
Atomic number	19
Atomic mass	39.10
Melting point	63.5°C
Electron configuration	[Ar] 4s ¹

Helmets



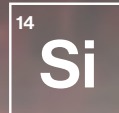
Carbon



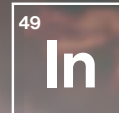
Iron



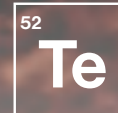
Titanium



Silicon



Indium



Tellurium



Germanium

Hot Spot camera
(infra-red tracking)

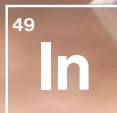
LED flashing
red wickets



Gallium



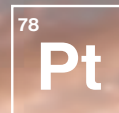
Aluminium



Indium



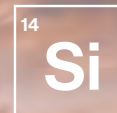
Gold



Platinum



Barium



Silicon



Iron

Snickometer
(sound detection)



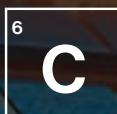
The ICC Women's Cricket World Cup is the sport's oldest cricket championship. It was first played in 1973, two years before the first men's event.

International Cricket Council

Mechanical
lawn roller



Iron



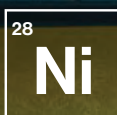
Carbon



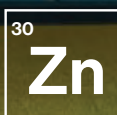
Silicon



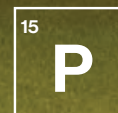
Manganese



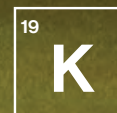
Nickel



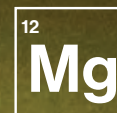
Zinc



Phosphorus



Potassium



Magnesium

Cricket ground
fertilisers

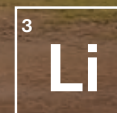
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minerals.org.au



Silicon



Silver



Lithium



Cobalt

Cricket bat
sensors

18 CRICKET



WIDE WORLD OF
MINERALS



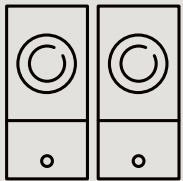
21, 39, 57-71

Ree

Rare earth
elements

Rare earth elements

COMMON USES



Speakers



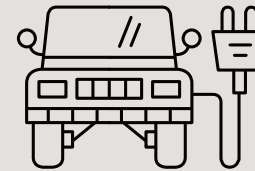
Wind turbines



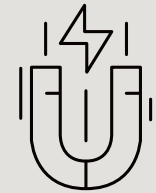
Telescopes



MRI scanners



Electric vehicles



Magnets

DID YOU KNOW?



Magnetic metals

Rare earth magnets make the strongest permanent magnets available, power the motors of electric vehicles and turn the blades of energy-generating wind turbines. They also make our favourite gadgets faster, smaller and lighter.



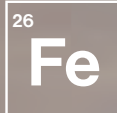
THERE ARE 17 RARE EARTH ELEMENTS

Cerium
Dysprosium
Erbium
Europium
Gadolinium
Holmium

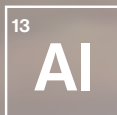
Lanthanum
Lutetium
Neodymium
Praseodymium
Promethium
Samarium

Scandium
Terbium
Thulium
Ytterbium
Yttrium

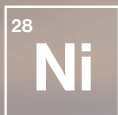
Water skis
(& fittings)



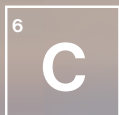
Iron



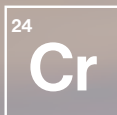
Aluminium



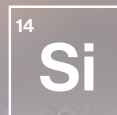
Nickel



Carbon



Chromium



Silicon



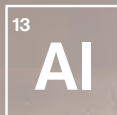
Copper



Gold

Surf trackers
(board-mounted
performance sensors)

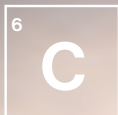
Hydrofoil
board



Aluminium



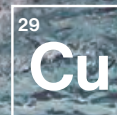
Titanium



Carbon



Silicon



Copper



Neodymium



Dysprosium



Terbium

Competition
megaphone

Jet ski



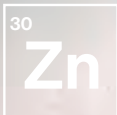
Iron



Chromium



Carbon



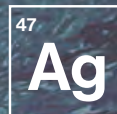
Zinc



Nickel



Gold



Silver

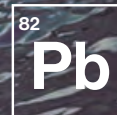


Copper

Tidal sensors
(buoy-mounted)



Silicon



Lead

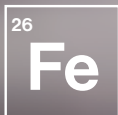
Surfboard artwork
(inks & pigments)



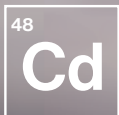
Titanium



Cobalt



Iron



Cadmium



Apple Watch is killing off the megaphone
at professional surfing comps. An app relays
heat information, notifies surfers of violations
and vibrates when it's time to catch a wave.
World Surf League

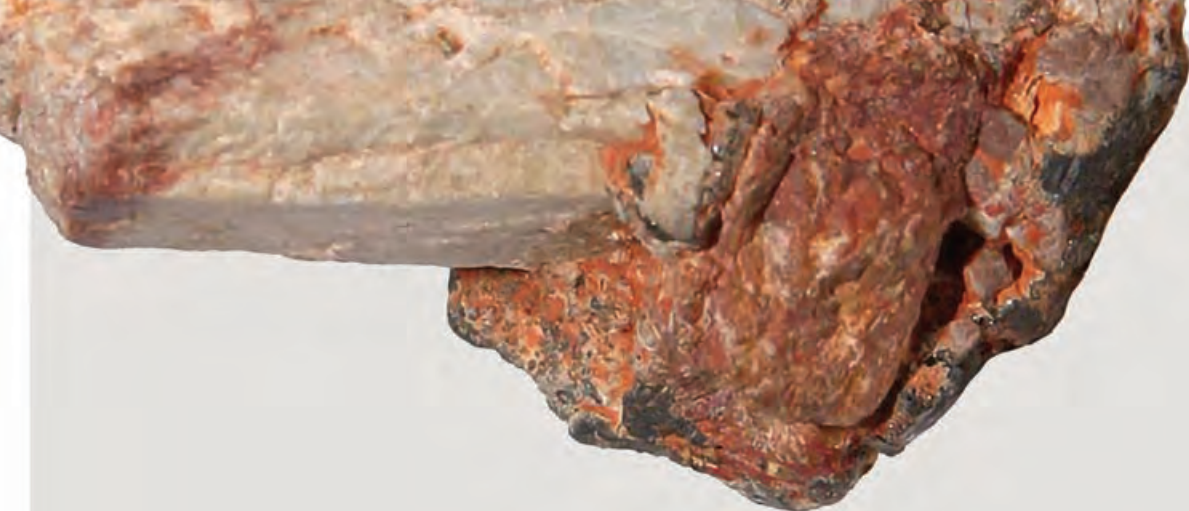
19

WATER SPORTS

WIDE WORLD OF
MINERALS



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minerals.org.au



Scandium

Scandium

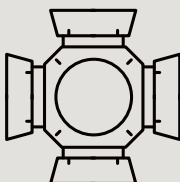
COMMON USES



Bicycle frames



Aerospace



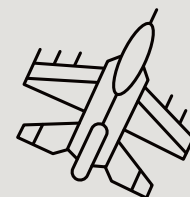
Studio lights



Televisions

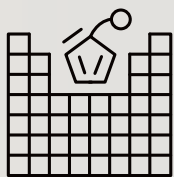


Fluorescent lamps



Defence industries

DID YOU KNOW?



Elemental predictions

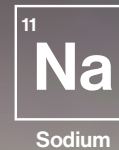
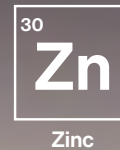
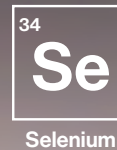
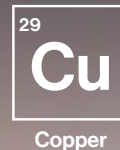
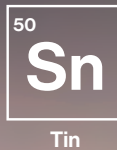
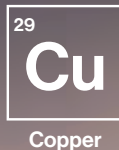
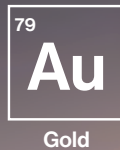
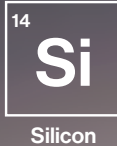
Dmitri Mendeleev, the father of the periodic table, predicted the existence of an element with an atomic mass between 40 and 48 in 1869. Lars Fredrik Nilson detected such an element in 1879 which he named scandium, from the Latin Scandia meaning 'Scandinavia'.



PROPERTIES

Symbol	Sc
Atomic number	21
Atomic mass	44.96
Melting point	1,541°C
Electron configuration	[Ar] 3d ¹ 4s ²

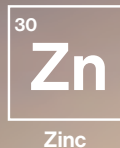
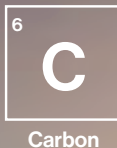
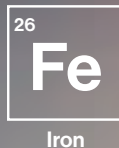
Photo finish cameras



Race horse nutrition



Starting gates



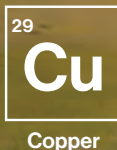
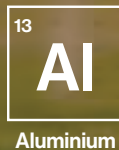
First run in 1861, the Melbourne Cup was a cup in name only until 1865. However, the first cup, deemed a monstrosity by its owner, was sold to the Flemington Hunt Club which rebranded the trophy for its own annual cup.

National Museum Australia

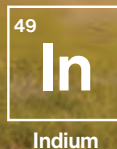
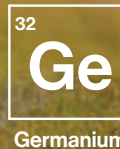
20 HORSE RACING

WIDE WORLD OF MINERALS

Horseshoes, stirrups & bits



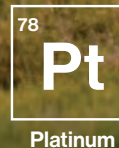
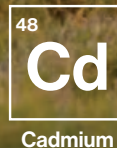
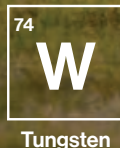
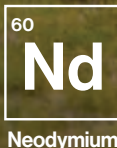
Thermal imaging (horse health)



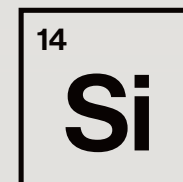
Melbourne Cup



Sound system



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Australian Mining
minerals.org.au



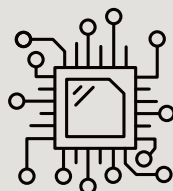
Silicon

Silicon

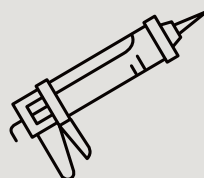
COMMON USES



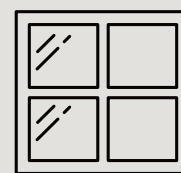
Pottery



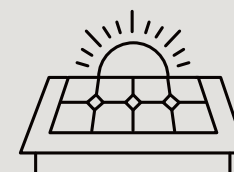
Semiconductors



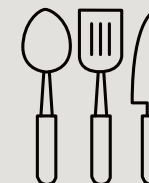
Sealants



Glass



Solar panels



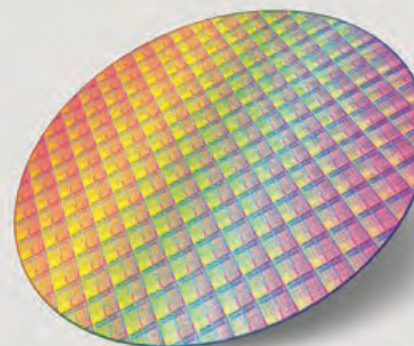
Cooking utensils

DID YOU KNOW?



The rise of Silicon Valley

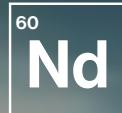
The name 'Silicon Valley' was popularised by tech reporter Don Hoefler in 1971 in a series of columns about the area's burgeoning semiconductor industry. The silicon chip remains a building block of modern day computers and electronics.



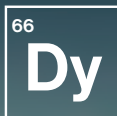
PROPERTIES

Symbol	Si
Atomic number	14
Atomic mass	28.09
Melting point	1,414°C
Electron configuration	[Ne] 3s ² 3p ²

LED media
mesh screen
(Allegiant Stadium*)



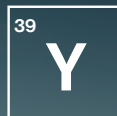
Neodymium



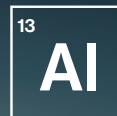
Dysprosium



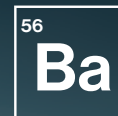
Europium



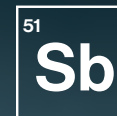
Yttrium



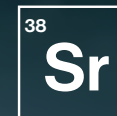
Aluminium



Barium



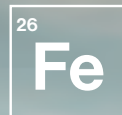
Antimony



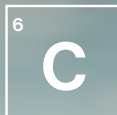
Strontium

Half-time
show (sound,
lighting)

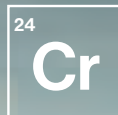
Translucent dome roof
(stainless steel cable system
at Allegiant Stadium*)



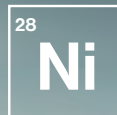
Iron



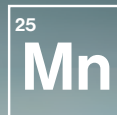
Carbon



Chromium



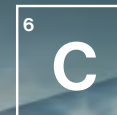
Nickel



Manganese



Iron



Carbon



Titanium

Helmets &
faceguards



21 GRIDIRON



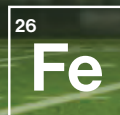
WIDE WORLD OF
MINERALS

For high school footballers
in the US, the odds of being
drafted to the NFL is roughly
0.00075%. That's around the
same likelihood as being
struck by lightning.

National Collegiate
Athletic Association



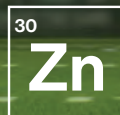
Retractable
turf field
(motorised)



Iron



Manganese



Zinc

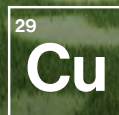


Phosphorus

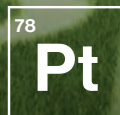


Potassium

Climate-controlled
stadium
(Allegiant Stadium*)



Copper



Platinum



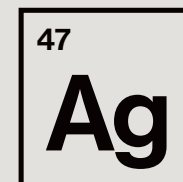
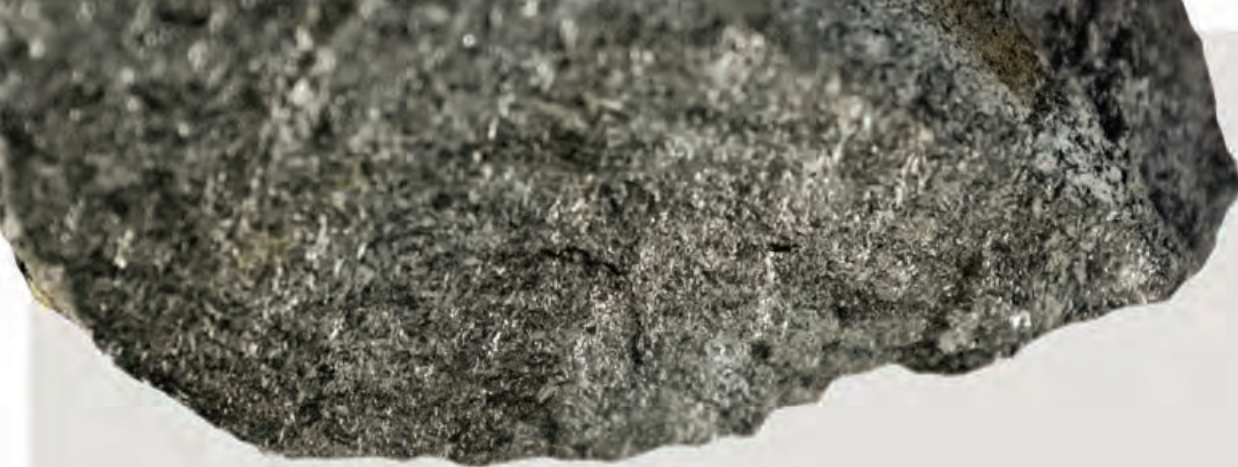
Gold



Palladium

* Allegiant Stadium not pictured.

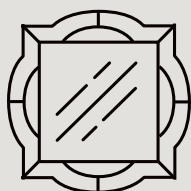
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Mining**
minerals.org.au



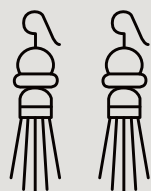
Silver

Silver

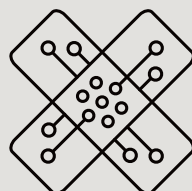
COMMON USES



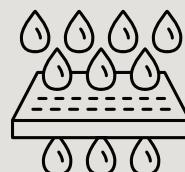
Mirrors



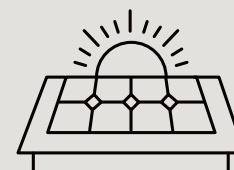
Jewellery



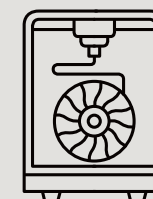
Wound care



Water purification



Solar panels



3D printing

DID YOU KNOW?



Beating bacteria

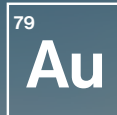
Silver has been used for centuries in medicine because of its antibacterial properties. It remains a wound management agent today, especially for burns patients. Unlike manufactured antibiotics, bacteria do not develop an immunity to silver.



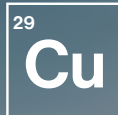
PROPERTIES

Symbol	Ag
Atomic number	47
Atomic mass	107.87
Melting point	962°C
Electron configuration	[Kr] 4d ¹⁰ 5s ¹

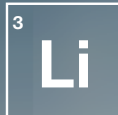
Electronic
scoring systems



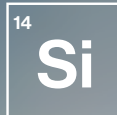
Gold



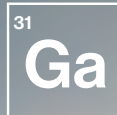
Copper



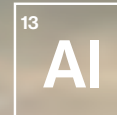
Lithium



Silicon



Gallium



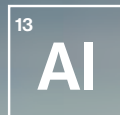
Aluminium



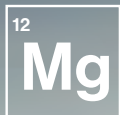
Phosphorus

Sights
& optics

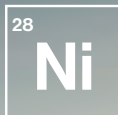
Archery
bow riser



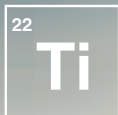
Aluminium



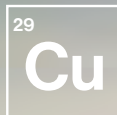
Magnesium



Nickel



Titanium



Copper



Competition
pistols (& rifles,
shotguns)



Iron



Carbon

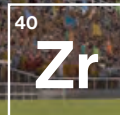


Titanium



Zinc

Acoustic
sensors



Zirconium



Titanium



Lead

Arrows



Aluminium



Carbon

Darts



Tungsten



Nickel



Iron



Copper

22

PRECISION SPORTS

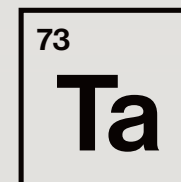


Five-time Olympic archer Khatuna Lorig trained actress Jennifer Lawrence how to convincingly handle a bow and arrow for *The Hunger Game* films.

WIDE WORLD OF
MINERALS



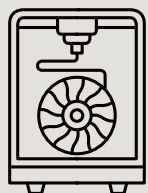
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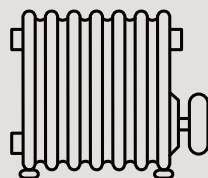
Tantalum

Tantalum

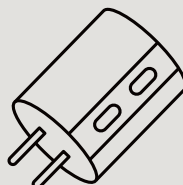
COMMON USES



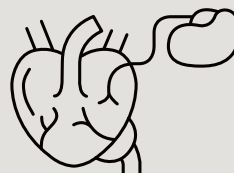
3D printing



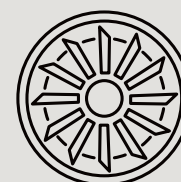
Heat exchangers



Capacitors



Surgical implants

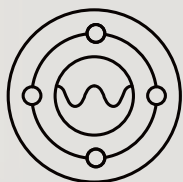


Jet engines



Defence industries

DID YOU KNOW?



Less abundant than gold

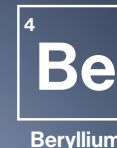
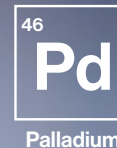
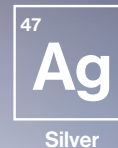
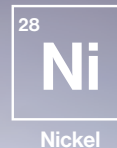
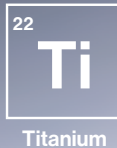
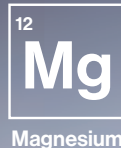
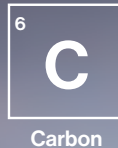
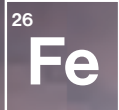
Tantalum is remarkable for being the rarest stable element in the solar system. Just one atom of tantalum exists for every 181 billion atoms of other elements, which makes tantalum far less abundant than any of the traditional precious metals, including gold.



PROPERTIES

Symbol	Ta
Atomic number	73
Atomic mass	180.95
Melting point	3,017°C
Electron configuration	[Xe] 4f ¹⁴ 5d ³ 6s ²

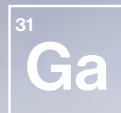
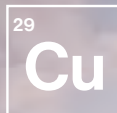
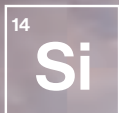
Motorcycle



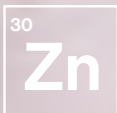
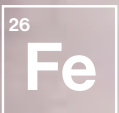
Transponder
(RFID timing)



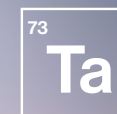
Radio
receiver



Spectator
barrier

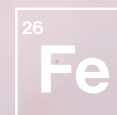


Helmet camera
(point-of-view)

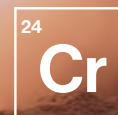


Motocross is not for the faint
of heart. The risk of traumatic
injury in motocross is 25 times
higher than for football.

gitnux.org



Tool kit

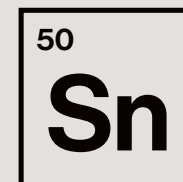


23 MOTOCROSS

WIDE WORLD OF
MINERALS



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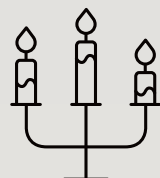
Tin

Tin

COMMON USES



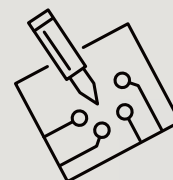
Magnets



Pewter



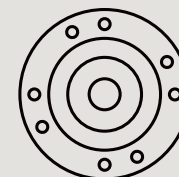
Tin cans



Solder



Touchscreens



Metal bearings

DID YOU KNOW?



Nod to the Academy

The Academy Award of Merit's Oscar statuette is made primarily of tin. The figure, a stylised knight holding a crusader's sword and standing on a film reel, is made of Britannia metal (93% tin, 5% antimony, 2% copper) and plated with 24 carat gold.



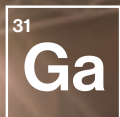
PROPERTIES

Symbol	Sn
Atomic number	50
Atomic mass	118.71
Melting point	232°C
Electron configuration	[Kr] 4d ¹⁰ 5s ² 5p ²

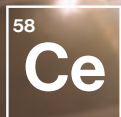
Electronic
scoreboard



Gold



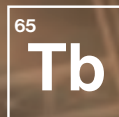
Gallium



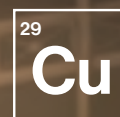
Cerium



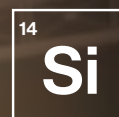
Europium



Terbium



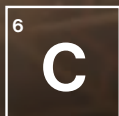
Copper



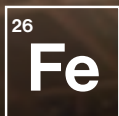
Silicon

Buzzer

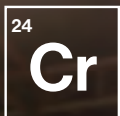
Basketball or
netball hoops



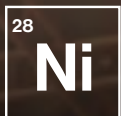
Carbon



Iron



Chromium



Nickel



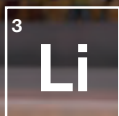
24 BASKETBALL

WIDE WORLD OF
MINERALS

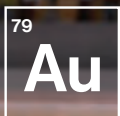
Countdown
clock



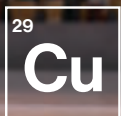
Silicon



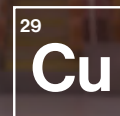
Lithium



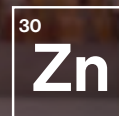
Gold



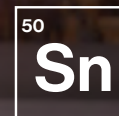
Copper



Copper



Zinc



Tin

Ball
pressure
gauge

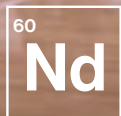
Sound
system



Aluminium



Titanium



Neodymium



Tungsten



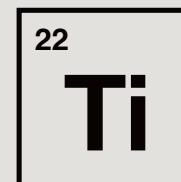
Molybdenum



The first basketball game ever
played on Australian soil was in
South Australia in 1897 – only
six years after the sport was
invented in the US.

Spalding.com.au

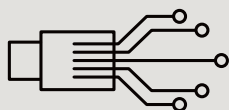
Resourcing tomorrow
**Australian
Mining**
minerals.org.au



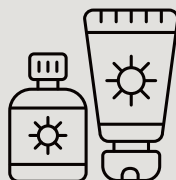
Titanium

Titanium

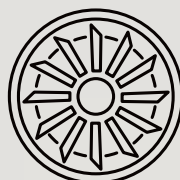
COMMON USES



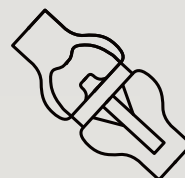
Fibre optics



Sunscreen



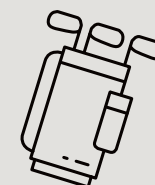
Aircraft engines



Medical implants

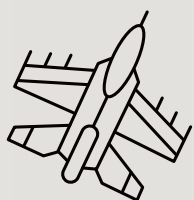


Car paint



Sporting goods

DID YOU KNOW?



To infinity and beyond!

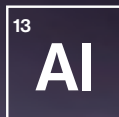
Titanium mineral production comes from mineral sands. Named after the Greek Titans, titanium is twice as strong as steel but 45 per cent lighter. Resistant to corrosion, titanium is widely used in the aeronautics and aerospace industries.



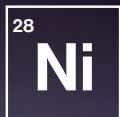
PROPERTIES

Symbol	Ti
Atomic number	22
Atomic mass	47.87
Melting point	1,670°C
Electron configuration	[Ar] 3d ² 4s ²

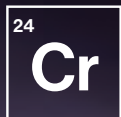
Figure skating blades



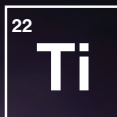
Aluminium



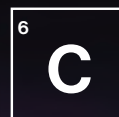
Nickel



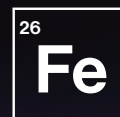
Chromium



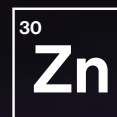
Titanium



Carbon



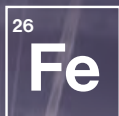
Iron



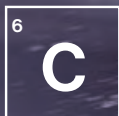
Zinc

Ice hockey goals

Force plate



Iron



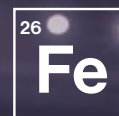
Carbon



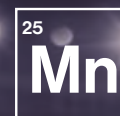
Aluminium



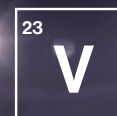
Silicon



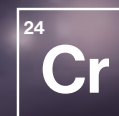
Iron



Manganese



Vanadium

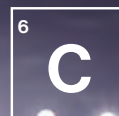


Chromium

Competition ice rink

25 ICE SPORTS

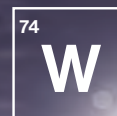
WIDE WORLD OF
MINERALS



Carbon



Molybdenum

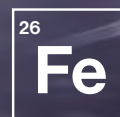


Tungsten

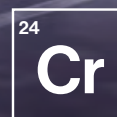


Cobalt

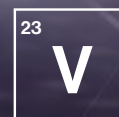
Ice hockey blades



Iron

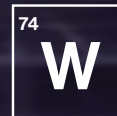


Chromium

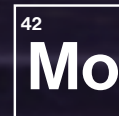


Vanadium

Zamboni
(ice resurfer)



Tungsten



Molybdenum



Ice skating is believed to have originated in Scandinavia as early as 1000 BC. People strapped animal bones to their feet to glide across frozen lakes rather than walk around them.

Britannica.com

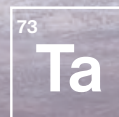
Slow motion cameras



Copper



Gold

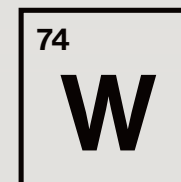


Tantalum



Tin

Resourcing tomorrow
Australian Mining
minerals.org.au



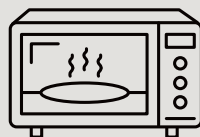
Tungsten

Tungsten

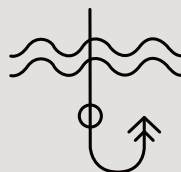
COMMON USES



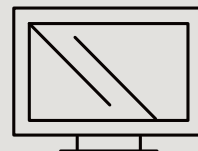
Light bulbs



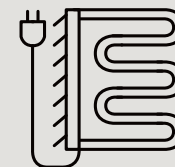
Microwaves



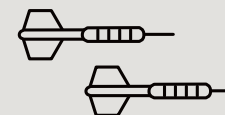
Fishing sinkers



Televisions



Heating elements



Darts

DID YOU KNOW?



In sheep's clothing

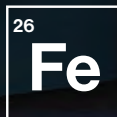
Tungsten is the metal of choice for gold counterfeiters. It has earned the dubious reputation because it shares a similar density to gold. Ingots filled with tungsten spooked markets and sparked conspiracy theories when discovered in 2012.



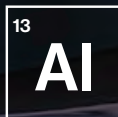
PROPERTIES

Symbol	W
Atomic number	74
Atomic mass	183.84
Melting point	3,414°C
Electron configuration	[Xe] 4f ¹⁴ 5d ⁴ 6s ²

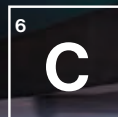
Bobsleigh



Iron



Aluminium



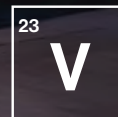
Carbon



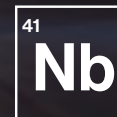
Titanium



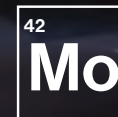
Tungsten



Vanadium



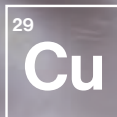
Niobium



Molybdenum

Steel runners

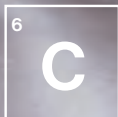
Ice track
(refrigeration
& evaporation)



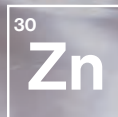
Copper



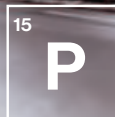
Aluminium



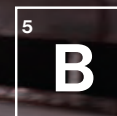
Carbon



Zinc



Phosphorus



Boron



Vanadium

Reinforced
concrete



Iron



Carbon



Manganese

Electronic
sensors



Silicon



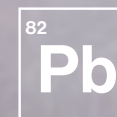
Copper



Gold



Silver



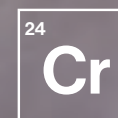
Lead



Aluminium



Manganese



Chromium

Bobsleigh shoes
(spike plate)



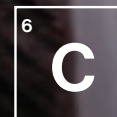
26 BOBSLED

WIDE WORLD OF
MINERALS

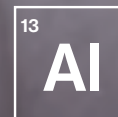
Brake lever



Iron



Carbon



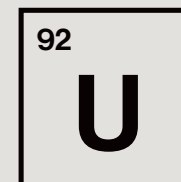
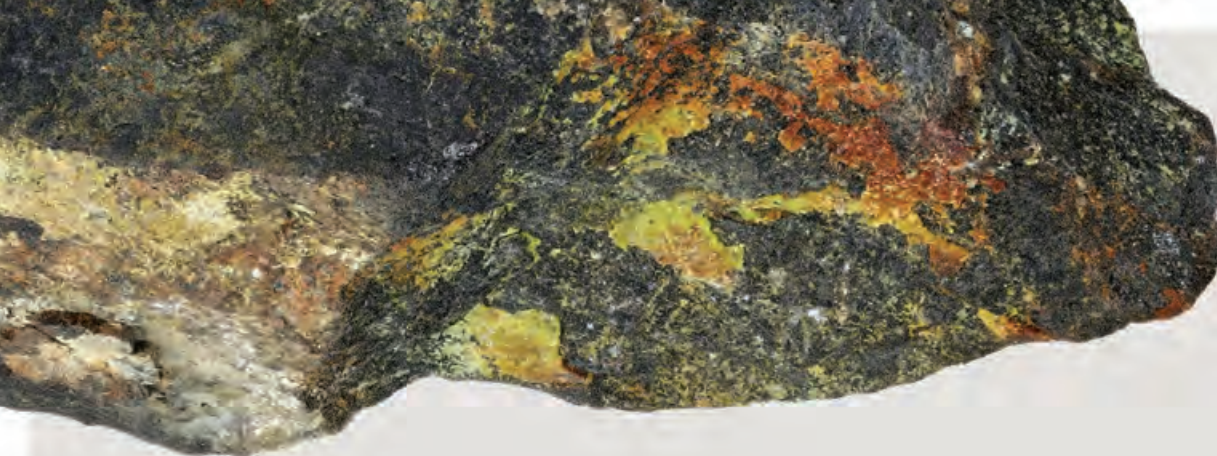
Aluminium



A 4-man sled can reach speeds
of around 150 kph! Bobsledders
can experience 5 or 6 Gs (g-forces)
in some of the harshest corners.

International Bobsleigh & Skeleton Federation

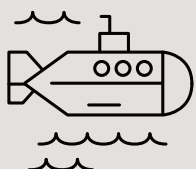
Resourcing tomorrow
**Australian
Mining**
minerals.org.au



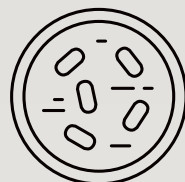
Uranium

Uranium

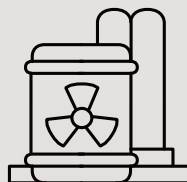
COMMON USES



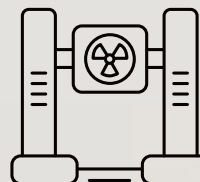
Submarines



Medical research



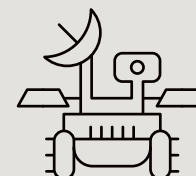
Nuclear energy



Industrial x-rays

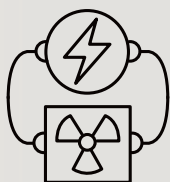


Cancer diagnosis



Aerospace

DID YOU KNOW?



The infinite power source

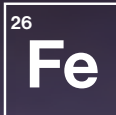
As a power source, uranium is practically infinite. Enriched uranium can produce 3.7 million times the energy of coal. It can also be reused multiple times. A golfball-sized amount of nuclear material provides a lifetime of energy for one person.



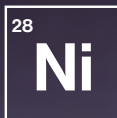
PROPERTIES

Symbol	U
Atomic number	92
Atomic mass	238.03
Melting point	1,135°C
Electron configuration	[Rn] 5f ³ 6d ¹ 7s ²

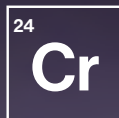
Face guard
(batting helmet)



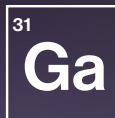
Iron



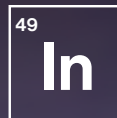
Nickel



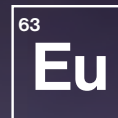
Chromium



Gallium



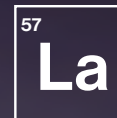
Indium



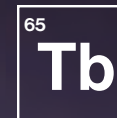
Europium



Gadolinium



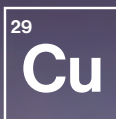
Lanthanum



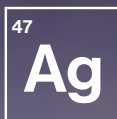
Terbium

Night lights
(LED stadium)

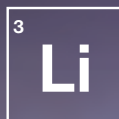
Motion sensors
(pitchers & hitters)



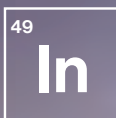
Copper



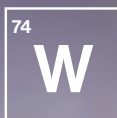
Silver



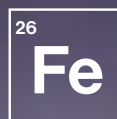
Lithium



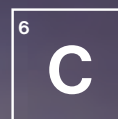
Indium



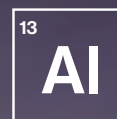
Tungsten



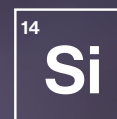
Iron



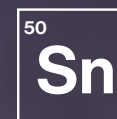
Carbon



Aluminium

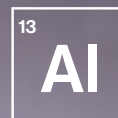


Silicon

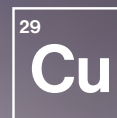


Tin

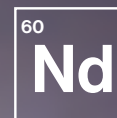
High tech
dugouts



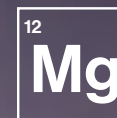
Aluminium



Copper

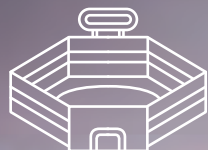


Neodymium



Magnesium

National
anthem
(sound system)



World Series championship ring
(white gold)



Gold



Nickel



Zinc

No longer just an American
pastime, a Nespresso machine
in the Italian team's dugouts stole
the show at the World Baseball
Classic clash in Taiwan.

NBC Sports

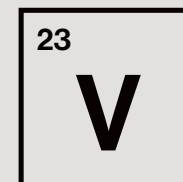


27

BASEBALL

Resourcing tomorrow
**Australian
Mining**
minerals.org.au

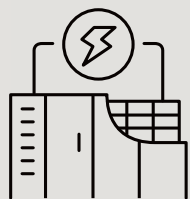
WIDE WORLD OF
MINERALS



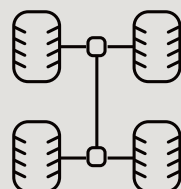
Vanadium

Vanadium

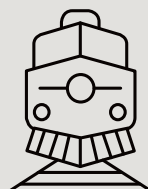
COMMON USES



Battery storage



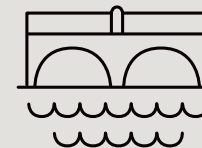
Car chassis



Railway tracks



Wind turbines

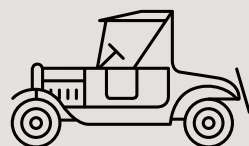


Bridges



Jet engines

DID YOU KNOW?



Driving early transportation

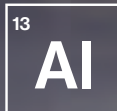
One of the first uses of vanadium was in the steel chassis of the 1908 Model T Ford. 'Tin Lizzie' represented the first affordable family car thanks to fabrication efficiencies and was declared Car of the Century at a glitzy ceremony in Las Vegas in 1999.



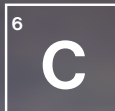
PROPERTIES

Symbol	V
Atomic number	23
Atomic mass	50.94
Melting point	1,910°C
Electron configuration	[Ar] 3d ³ 4s ²

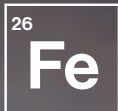
Supermaxi
yacht



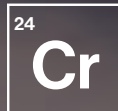
Aluminium



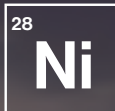
Carbon



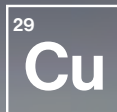
Iron



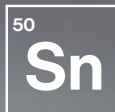
Chromium



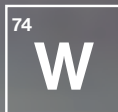
Nickel



Copper



Tin



Tungsten

28

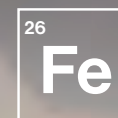
YACHT RACING

WIDE WORLD OF
MINERALS



The inaugural Sydney to Hobart Yacht race in 1945 was originally intended as a post-World War II social cruise. British naval officer John Illingworth declared they make it a race.

Cruising Yacht Club of Australia



Iron

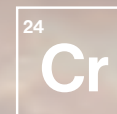


Tungsten

Hydraulic
winches



Nickel



Chromium



Silicon



Indium



Gallium

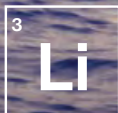


Silver



Platinum

Navigation
system



Lithium



Silicon



Copper



Gold

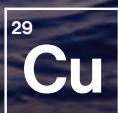


Aluminium

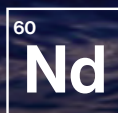
EPIRB
(Emergency
position indicating
radio beacon)



Gold



Copper



Neodymium



Ytterium

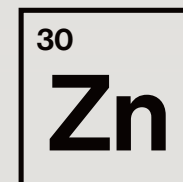
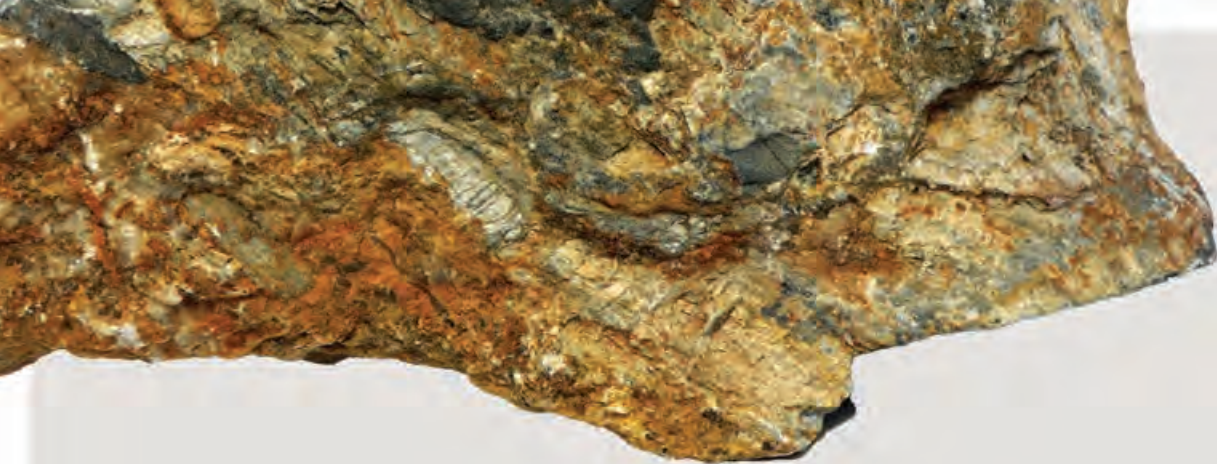


Samarium

Satellite
phone



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**Australian
Mining**
minerals.org.au



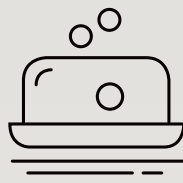
Zinc

Zinc

COMMON USES



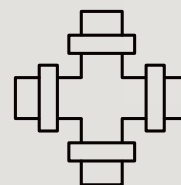
Rust prevention



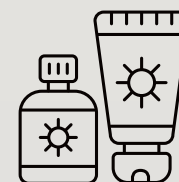
Soap



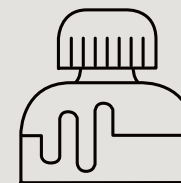
Plastics



Metal alloys



Sunscreen



Ink

DID YOU KNOW?



The original aphrodisiac

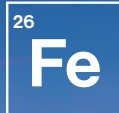
Oysters contain more zinc than any other food, which is one of the reasons they are believed to be an aphrodisiac. Zinc is crucial to hormone production. Casanova believed in the power of the mollusc – the 18th century lover would breakfast on 50 oysters.



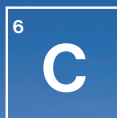
PROPERTIES

Symbol	Zn
Atomic number	30
Atomic mass	65.38
Melting point	420°C
Electron configuration	[Ar] 3d ¹⁰ 4s ²

Propeller
plane



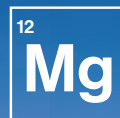
Iron



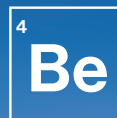
Carbon



Titanium



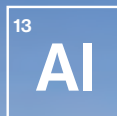
Magnesium



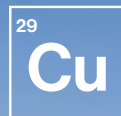
Beryllium



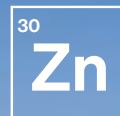
Altimeter
(altitude reader)



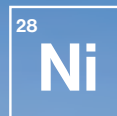
Aluminium



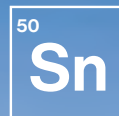
Copper



Zinc



Nickel



Tin

29 SKY DIVING

WIDE WORLD OF
MINERALS

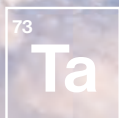
Wristcam
(camera)



Gold



Silver

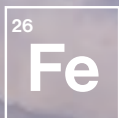


Tantalum



Neodymium

Harness



Iron



Aluminium



Titanium



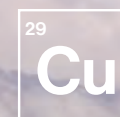
Parachute
AAD
(automatic
activation
device)



Silicon



Gold



Copper



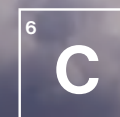
Tungsten



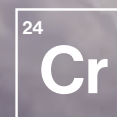
Nickel



Iron



Carbon



Chromium



Molybdenum

Hook
knife

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Mining**
minerals.org.au



Wingsuiters are a different breed. The extreme sport has a death rate of 1 in 500 jumps. In 1912, French tailor Franz Reichelt tested his parachute/wing invention when he jumped to his death from the Eiffel Tower.

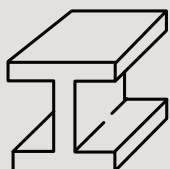
Gitnux.org



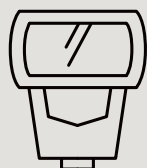
Zirconium

Zirconium

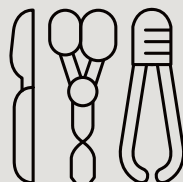
COMMON USES



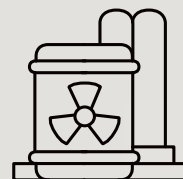
Steel alloys



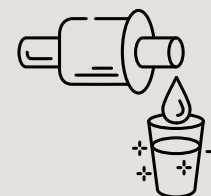
Flash bulbs



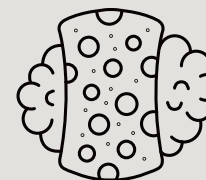
Surgical tools



Nuclear energy



Catalytic converters



Abrasives

DID YOU KNOW?



Cubic zirconias

Soviet scientists discovered they could create cubic zirconias (zirconium combined with dioxide) in a laboratory in the 1970s. They faceted the stone, named the crystals 'Djevalite' and began marketing them as simulated diamonds in 1976.



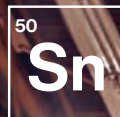
PROPERTIES

Symbol	Zr
Atomic number	40
Atomic mass	91.22
Melting point	1,854°C
Electron configuration	[Kr] 4d ² 5s ²

Punch
trackers



Indium



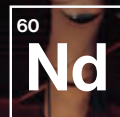
Tin



Gold



Tungsten



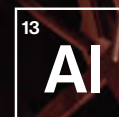
Neodymium



Iron



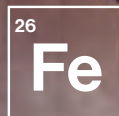
Carbon



Aluminium

Combat ring
(boxing, cage,
octagon etc)

Weighted
vests



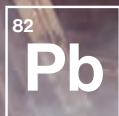
Iron



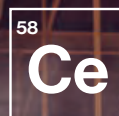
Carbon



Tungsten



Lead



Cerium



Silver



Manganese



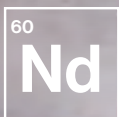
Lithium



Cobalt

VR simulators
(training)

Ring
announcer



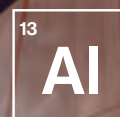
Neodymium



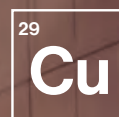
Barium



Titanium



Aluminium



Copper



Silicon

Biomechanic
tools (motion
capture)



Boxing first appeared as a formal Olympic event in the 23rd Olympiad (688 BC). However, visual evidence for boxing appears from the 3rd millennium BC in ancient Sumerian relief carvings.

Britannica.com

30

COMBAT SPORTS

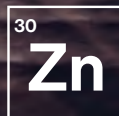


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Trip gong
(boxing bell)



Copper



Zinc

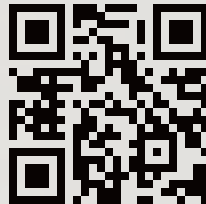


WIDE WORLD OF
MINERALS

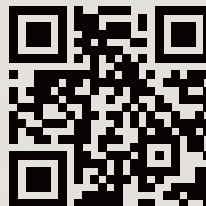
Learn more about the minerals and metals
that make every day possible.



Download PDF



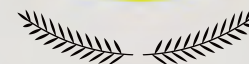
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SPORTS EDITION

things



WIDE WORLD OF MINERALS

Minerals Council of Australia

Ph. +61 2 6233 0600

E. info@minerals.org.au

minerals.org.au

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July 2024





SPORTS EDITION

30
things