

**Name
That
Metal!**



Metals

- **copper**
- **aluminum**
- **zinc**
- **iron**
- **brass**



History of Copper

Copper

- Earliest known discovery: in 9000 BC in the Middle East
- Italians used copper lumps as money in the 6th-3rd centuries BC
- Copper wire was used as an insulator in the early 1800s
- *Historical uses:* money, coins, wire, copper tubing in ancient Egypt, thin copper sheets for canvas paintings, coins



History of Aluminum



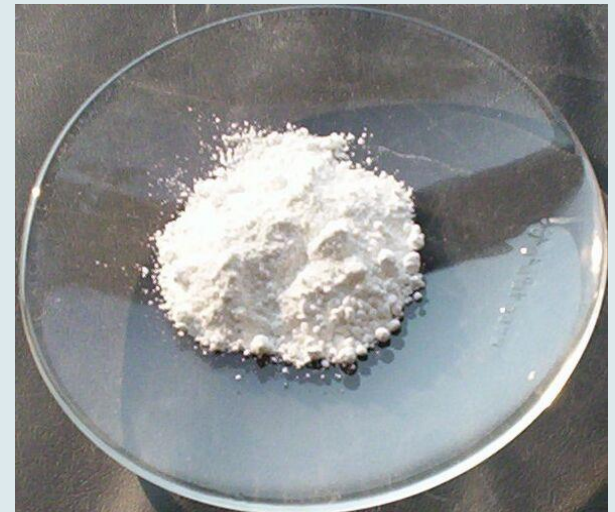
Aluminum

- Obtained name from Latin for alum, alumen
- Earliest traces found around 5300 BC, however not “discovered” until 1800s by Sir Humphrey Davy
- *Historical uses*: fabric dyes, cosmetics

History of Zinc

Zinc

- Earliest traces in 20 BC–14 AD by the Romans
- Recognized as a separate metal in 16th century
- US production began in 1850
- *Historical uses:* healing wounds, sore eyes



History of Iron

Iron

- Known and used since pre-historic times—more than 7,000 years ago
- Hittites in West Asia were among the first to use it
- After the Dark Ages, Mediterranean people used it
- *Historical uses:* kitchen utensils, jewelry, weapons (knives, arrowheads, spears)
- From 1000 BC to present day, ***iron is the most-used metal***



History of Brass

Brass

- Copper-zinc alloys produced in the early fifth millennium BC in China
- Widely used in east and central Asia by second and third century BC
- Romans discovered how to produce brass
- *Historical uses:* coins, jewelry, golden helmets, vessels and bowls



Basic Properties

Metal	Density	Melting Point	Ferromagnetic?
copper (Cu)	8.96 g·cm ⁻³	1084.62 °C 1984.32 °F	No
aluminum (Al)	2.70 g·cm ⁻³	660.32 °C 1220.58 °F	No
zinc (Zn)	7.14 g·cm ⁻³	419.53 °C 787.15 °F	No
iron (Fe)	7.874 g·cm ⁻³	1538 °C 2800 °F	Yes
brass	8.73 g·cm ⁻³	940 °C 1724 °F	No

Uses



Metal	Uses
copper (Cu)	Electrical wiring, pipes, building construction, radiators, brakes, gutters, roofs, electric motors
aluminum (Al)	Packaging (cans, foils, bottle tops), airplanes, cars (wheels, impellers, hoods, mirrors), construction (casting, pipes, skylights, rods, ladders)
zinc (Zn)	Batteries, paint, rubber, toothpaste, automotive parts, electrical and hardware industries, window and door frames
iron (Fe)	Machinery, buildings, railings, tools (tie-rods, bolts, straps), bridges, kitchen appliances, automobile parts, ship frames
brass	Zippers, locks, bearings, gears, mirrors, musical instruments, fixtures, art, plumbing, cable connectors and fittings



References

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History of iron: <http://nautilus.fis.uc.pt/st2.5/scenes-e/elem/e02610.html>

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The history of brass: <http://metals.about.com/od/properties/a/The-History-Of-Brass.htm>

Image Sources

SLIDE 1:

Question face: Microsoft clipart at <http://office.microsoft.com/en-us/images/results.aspx?qu=question&ex=1#ai:MC900434411>|

SLIDE 3:

Top left (coiled copper pipe) Missouri State Highway Patrol

<http://www.mshp.dps.mo.gov/MSHPWeb/PatrolDivisions/DDCC/Units/RuralCrimes/ruralCrimes.html>

Top right (aluminum foil) City of Durham, NC

<http://durhamnc.gov/ich/op/swmd/Pages/RecyclingIsGreat.aspx>

Middle (zinc) 2010 Alchemis-hp, Wikimedia Commons

http://commons.wikimedia.org/wiki/File:Zinc_fragment_sublimed_and_1cm3_cube.jpg

Lower left (iron ore pellets, pile) 2007 Lars Lentz

http://commons.wikimedia.org/wiki/File:LightningVolt_Iron_Ore_Pellets.jpg

Lower right (brass pot) 2012 Adityamadhav83, Wikimedia Commons

http://commons.wikimedia.org/wiki/File:Brass_vessel_at_Madhurawada.JPG?fastcci_from=542574

SLIDE 4:

(native copper chunk) 2009 Jonathan Zander, Wikimedia Commons

<http://commons.wikimedia.org/wiki/File:NatCopper.jpg>

Top left (copper pipe fittings) 2007 Torsten Bätge, Wikimedia Commons

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SLIDE 5:

Aluminum (rock) U.S. Geological Survey http://commons.wikimedia.org/wiki/File:Aluminum_Metal.jpg

Image Sources

SLIDE 6:

(zinc capsules) National Institutes of Health <http://ods.od.nih.gov/images/content/Zinc-Pills.jpg>
(zinc oxide powder on plate) 2005 Walkerma, Wikimedia Commons
http://commons.wikimedia.org/wiki/File:Zinc_oxide.jpg

SLIDE 7:

(3 iron arrowheads) New Mexico Bureau of Land Management
http://www.nm.blm.gov/features/dinetah/disk_images/new_spain/weapons.html
(wrought iron railing) Seattle Parks Dept. <http://www.seattle.gov/PARKS/pergola/default.htm>

SLIDE 8:

(brass ring) National Park Service <http://www.nps.gov/media/photo/gallery.htm?tagID=12790>
(brass 5-yen coins) U.S. Mint <http://www.usmint.gov/kids/cartoons/coinsoftheworld/html/japan/?s=4>
(brass bowl) 2009 Peter Lewis, Wikimedia Commons
<http://commons.wikimedia.org/wiki/File:BrassSCC1.jpg>

SLIDE 10: top to bottom

Copper timpani/drum: Microsoft clipart at <http://office.microsoft.com/en-us/images/results.aspx?qu=copper&ex=1#ai:MC900390656>|

Aluminum can: Microsoft clipart at <http://office.microsoft.com/en-us/images/results.aspx?qu=aluminum&ex=1#ai:MP900341725|mt:2>|

Brass zipper & pull: Microsoft clipart at <http://office.microsoft.com/en-us/images/results.aspx?qu=zipper&ex=1#ai:MP900309622>|

Battery: Microsoft clipart at <http://office.microsoft.com/en-us/images/results.aspx?qu=batteries&ex=1#ai:MC900434731|mt:1,2>|

Iron bridge: 2007 Nigel Cox, Wikimedia Commons

http://commons.wikimedia.org/wiki/File:Liverpool,_The_Iron_Bridge,_Sefton_Park,_L17_-_geograph.org.uk_-_342444.jpg