



Elements of a high-tech society – metals make it possible

Most elements are metals, shown in grey in the periodic table alongside. Metals have a lattice (network) of positive nuclei surrounded by electrons that are free to move. This gives metals many of their special properties.

Use information from the [high-tech metals map](#) to complete the questions:

Periodic table of elements (Simon Gjerløv 2009, public domain).
 grey = metals; green/grey = metalloids;
 green = non-metals; blue = noble gases

- Circle the correct option to complete the sentences:
 - Metals are typically **solid / liquid / gas**.
 - They have a **dull / shiny** appearance because metals reflect light.
 - Metals are **brittle / malleable** and **ductile / inflexible** with good electrical and heat **conductivity / insulation**.
- Some metals are particularly useful in high-tech industry because they have unique properties.
 - Unique chemical properties: _____
 - Unique physical properties: _____
- List some products that rely on high-tech metals in their construction. _____

- Which high-tech metals are really groups of metals? _____



5. Where do these groups occur on the periodic table? _____

6. Fill in the table below to summarise properties, sources and uses of high-tech metals

High-tech metal	Properties	Main sources	Uses
Lithium			
Scandium			
Cobalt			
Rare Earth Elements			
Platinum Group Elements			
Copper			
Gold			

7. Do you think it is important for Australia to mine high-tech metals? Justify your answer using information from the table in question 6. _____



8. High-tech metals are valuable. Do we effectively recycle these elements? Explain the current recycling status and opportunities. _____

References:

M.J. Armstrong, P.J. Carter, M.J. Drummond, G.D. Fleming, D.B. Forster & L.M. Talbot (compilers) 2018. High-tech metal resources of New South Wales. Geological Survey of New South Wales, Maitland. Available online at <https://resourcesandgeoscience.nsw.gov.au/miners-and-explorers/geoscience-information/products-and-data/high-tech-metal-resources-of-nsw>

This resource was produced by Australian Earth Science Education in partnership with the Department of Regional NSW's Geological Survey of New South Wales.