Periodic Properties

Designed for: Year 10 Science **Sub-strand(s):** Chemical Sciences

Content Descriptors:

The atomic structure and properties of elements are used to organise them in the Periodic Table (ACSSU186)Different types of chemical reactions are used to produce a range of products and can occur at different rates (ACSSU187)

Context:

Metals and fuels are some of the key building blocks for an advancing society in the 21st century and these are major outputs for the resources sector. Quite often, chemical elements or pure substances aren't able to be extracted from the Earth's crust. As such, ores and crude products are extracted from the ground and need to be processed and purified before they are in a suitable and usable form. It is the role of chemists and chemistry to identify these reaction pathways from crude materials to pure products, and the role of chemical engineers to optimise processes to improve safety, increase yields and reduce processing time from input to output.

Intent:

The following resources may be used as a mini-unit on the topic indicated above with some additional scaffolding, structure and differentiation for each individual classroom, or can be used as stand-alone resources to assist with providing the minerals and energy context within the designated content descriptors.

Resource Types:

This pack of resources links to:

- Publication
- Periodic table
- Worksheets
- Experiment
- Web Interactives
- PowerPoint presentation

About Oresome Resources:

The Oresome Resources website is a collaborative educational initiative supported by the minerals and energy industry in Australia. These resources have been developed by teachers for teachers to provide syllabus support to the key learning areas of Science, Maths, Technologies and Huminites and Social Sciences.

Each of the resources are free to use by teachers and students to assist in meeting the learning objectives and achievement of students within their studies.

Resource	Name	Link	Description	Other Notes
1.	Everyday things mining makes possible publication	https://www.oresomeresources.com/resource/everyday-things-mining-makes-possible/	The 30 Things resources, produced by the Minerals Council of Australia showcases 30 everyday things and which elements are needed.	Students could do an element audit of this document across the 30 things to see which are used more readily in everyday items than others. Is there a reason for this? How abundant are these common elements in the Earth's crust? Geographically, where are the mines located in Queensland that produce these resources? Students could produce a "Periodic Table Heat Map" to demonstrate the results of their audit.
2.	Periodic Table	http://www.oresomeresources.com/resource/periodic-table/	Two periodic tables have been included in this resource – one with and one without element names.	The information is presented in the same way as the QCAA Formula and Data Book, providing great practice for students to become familiar with the information and layout before reaching Year 11 and 12.
3.	Building Stable	http://www.oresomeresources.com/resource/building-stable-elements/	This graphic organiser utilises online atom builders, like the one produced by ANSTO, to create electron shell diagrams for a selection	Students could explore the importance of these four elements (lithium, carbon,

	Elements worksheet		of important elements, and to use this information to predict its location on the Periodic Table.	aluminium, sulfur) to the resources sector and the manufacturing sector in Australia.
4.	ANSTO Atom Builder	ANSTO App: https://www.ansto.gov.au/education/apps#content-atom-builder	Build stable and radioactive isotopes using neutrons, protons and electrons with the ANSTO Atom Builder. Discover the uses and properties of common isotopes, and locate elements in the periodic table.	
5.	Classifying Elements worksheet	http://www.oresomeresources.com/resource/classifying-elements/	This worksheet provides some information about properties of metals and non-metals to classify materials into one of these two classifications. There is a small checkpoint activity at the end to check for understanding.	An experiment could be conducted at school to reinforce this classification scheme.
6.	Metal Reactivity Series worksheet	https://www.oresomeresources.com/resource/metal-reactivity-series/	This worksheet provides a wealth of information about metal reactivity, aluminium processing and iron processing. There is also the opportunity for students to practice writing word equations from chemical equations, or balancing chemical equations from word equations.	The information in this resource is a companion for resource 8.
7.	Putting them all together – creating compounds worksheet	https://www.oresomeresources.com/resource/putting-them-all-together-creating-compounds/	This worksheet contains charge tables for common monoatomic and polyatomic cations and anions. It also describes single displacement reactions before providing the opportunity for students to practice predicting products from word and chemical equations, and balance chemical equations. There is also a section on common ores and identifying both the extractable metal and the name of the ore from its chemical formula.	The information in this resource is a companion for resource 8.
8.	Metal reactivity	https://www.oresomeresources.com/resource/metal-reactivity-experiment-results/	This experiment can be conducted in school, with the metal samples as “unknowns”, or	Information from resources 6 and 7 will assist students in

	experiment results		the results as shown in this resource can be analysed at home and the questions can be answered by students.	completing the discussion section of this experiment.
9.	Copper Processing PowerPoint	https://www.oresomeresources.com/resource/copper-processing-powerpoint/	This PowerPoint provides images and chemical reactions involved in the processing of copper ores.	These two resources provide additional resources sector context around minerals processing and the use of chemistry to produce metals. It is recommended that these are used as extension activities for students who excel at this stage of Chemical Science in Year 10.
10.	Copper Processing Interactive	https://www.oresomeresources.com/interactive/copper-processing-interactive/	This interactive allows students to understand the process needed to extract copper-rich ores through to producing metal copper as a product.	