

Element Trendlines Lesson Guide

Activity	Element Trendlines		Duration	30 mins
Learning Intention	To compare the properties of the elements and relate them to their positions on the periodic table. To understand trends in the properties of elements.			
Year / Level	Australian Curriculum Years 7-10 Senior Chemistry	Curricular Link(s)	<p>AC9S7U05: use particle theory to describe the arrangement of particles in a substance, including the motion of and attraction between particles, and relate this to the properties of the substance</p> <ul style="list-style-type: none"> ● investigating properties of materials such as density, melting point and compressibility and explaining these in terms of particle arrangement <p>AC9S8U06: classify matter as elements, compounds or mixtures and compare different representations of these, including 2-dimensional and 3-dimensional models, symbols for elements and formulas for molecules and compounds</p> <ul style="list-style-type: none"> ● examining how Dmitri Mendeleev arranged the elements in the first version of the periodic table and comparing his arrangement with the current version <p>AC9S10U06: explain how the structure and properties of atoms relate to the organisation of the elements in the periodic table</p> <ul style="list-style-type: none"> ● examining how elements are organised in the periodic table and analysing patterns to discern that elements in the same group of the periodic table have similar properties ● investigating the physical properties of some metals and non-metals 	
Resources Required	Element set Trendline student worksheet Internet access for element research Useful websites to support students if required: <ul style="list-style-type: none"> ● <i>Element Summaries</i> https://www.rsc.org/periodic-table ● <i>Abundance in earth's crust and other properties</i> https://periodictable.com/Properties/A/CrustAbundance.an.html 			
Risk Assessment	Careful handling of the samples in the Elements Kit - Do not open containers			
Outline	Students work individually to complete the task for one or two elements, depending on class size. This could also work well as a collaborative learning task, with groups being assigned a range of elements to research. Students research historical information and data about the properties of the element/s they have been assigned. As they collect data they complete the associated worksheet . IT IS IMPORTANT FOR STUDENT DATA TO BE IN THE SAME UNITS FOR TRENDLINE COMPARISONS. Units have been specified on the worksheet but you can be changed if required.			

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	<p>With teacher guidance, students are asked to arrange themselves in order based on the data collected. Alternatively, the sample containers can be put into a line across a few tables. Examples:</p> <ul style="list-style-type: none">● From lowest atomic number to highest.● From lowest relative atomic mass to highest.● From first discovered to the most recently discovered.● From lowest melting point to highest.● From lowest boiling point to highest.● From lowest density to highest.● From lowest % abundance to highest (understanding of scientific notation required)● From lowest atomic radius to highest (higher level Chemistry)● From lowest specific heat capacity to highest (higher level Chemistry) <p>Each trendline should lead to discussion about the properties of the elements, links to their positions in the periodic table (group number and period number) and reasons why elements may be lower or higher in the line. It is also helpful to look at the very beginning and end of the line as these will not be the same every time.</p> <p>Students are to record their approximate position in the summary table on their worksheet before lining up again in the next trendline.</p> <p>Once all the trendlines have been made, students are to choose two results and explain WHY they think their element was in the position that it was (space provided on the worksheet).</p> <p>The word document worksheet can be edited to remove (or add) trendlines you feel would be appropriate for the class. It would take a long time to do them all.</p> <p>A teacher reference sheet is included. Please note that the data is a rough guide only. Students may find different information during their research.</p>
Worksheet	<i>Element Trendline Student Worksheet</i>