

Periodicity Cards

How do we know that our present periodic table is correct and complete? After all, throughout history people have thought they've found the "correct" answer. But we're confident that our modern periodic table has ALL of the elements in the correct order.

Print and cut out the cards, perhaps 4 or 6 sets for a class.

There are two versions of the cards – the coloured ones (for metals/non-metals/inert gases) make it easier if necessary.

Ask pupils to arrange the cards in a line, in order of atomic mass. That's what Dimitri Mendeleev did at first. Note that the argon, potassium and calcium cards have slightly wrong atomic masses to make this work for students.

Then look for patterns in the cards, e.g. read the Lithium card, then look along the line until you find another element that does similar things. Keep going with this idea until they realise that we can **move the cards into 3 rows of 8, with each column containing elements that behave in similar ways**. At some stage you could give them the blank grid to help if needed.

The result should be pretty close to the first 3 rows of the modern periodic table without the transition metals. Gallium and Astatine are also missing (I couldn't think of any helpful properties to include, so I left them as gaps to be noticed).

3 Li	4 Be	5 B	6 C	7 N	8 O	9 F	10 Ne
11 Na	12 Mg	13 Al	14 Si	15 P	16 S	17 Cl	18 Ar
19 K	20 Ca	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr
37 Rb	38 Sr	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe

Point out that we have done this by spotting patterns in the properties of the elements – in this case, a periodicity of 8. Also point out that there are 2 gaps where we can see there ought to be elements.

Our cards have 3 of the alkali metals – what should the next alkali metal (rubidium) be like?

The modern periodic table has no gaps, and is arranged in order of atomic number rather than atomic mass, but it gives a very similar result. It has elements with similar properties grouped together, and now that we know more about what's inside atoms we know that this table is a good way to arrange

<p>Lithium</p> <p>Soft silvery metal</p> <p>When put in water it fizzes and gives off hydrogen gas.</p> <p>Atomic mass: 7</p>	<p>Beryllium</p> <p>Metal</p> <p>Atomic mass: 9</p>	<p>Boron</p> <p>Non-metal</p> <p>Solid at room temperature</p> <p>Atomic mass: 10</p>	<p>Carbon</p> <p>Non-metal</p> <p>Not a very good conductor of electricity</p> <p>Atomic mass: 12</p>	<p>Nitrogen</p> <p>Non-metal</p> <p>A gas at room temperature</p> <p>Atomic mass: 14</p>	<p>Oxygen</p> <p>Non-metal</p> <p>A gas at room temperature</p> <p>Atomic mass: 16</p>	<p>Fluorine</p> <p>Non-metal, extremely reactive</p> <p>A gas at room temperature</p> <p>Atomic mass: 19</p>	<p>Neon</p> <p>Colourless, odourless gas, doesn't react with anything</p> <p>Atomic mass: 20</p>
<p>Sodium</p> <p>Soft silvery metal</p> <p>When put in water it fizzes strongly and gives off hydrogen gas.</p> <p>Atomic mass: 23</p>	<p>Magnesium</p> <p>silvery metal</p> <p>Burns with a bright white flame</p> <p>Atomic mass: 24</p>	<p>Aluminium</p> <p>Light, easily-worked metal</p> <p>Atomic mass: 27</p>	<p>Silicon</p> <p>Non-metal</p> <p>Not a very good conductor of electricity - a semiconductor</p> <p>Atomic mass: 28</p>	<p>Phosphorus</p> <p>Non-metal, solid at room temperature. Very reactive, burns vigorously</p> <p>Atomic mass: 31</p>	<p>Sulphur</p> <p>Non-metal, yellow solid at room temperature.</p> <p>Atomic mass: 32</p>	<p>Chlorine</p> <p>Non-metal, gas at room temperature. Very reactive.</p> <p>Atomic mass: 35.5</p>	<p>Argon</p> <p>Colourless, odourless gas, doesn't react with anything</p> <p>Atomic mass: 39</p>
<p>Potassium</p> <p>Soft silvery metal</p> <p>When put in water it fizzes violently and gives off hydrogen gas.</p> <p>Atomic mass: 40</p>	<p>Calcium</p> <p>Grey silvery metal</p> <p>Atomic mass: 41</p>	<p><i>A mysterious gap in the table</i></p>	<p>Germanium</p> <p>Non-metal</p> <p>Not a very good conductor of electricity - a semiconductor</p> <p>Atomic mass: 73</p>	<p><i>A mysterious gap in the table</i></p>	<p>Selenium</p> <p>Non-metal, solid at room temperature. Conducts electricity when light is shone onto it.</p> <p>Atomic mass: 79</p>	<p>Bromine</p> <p>Non-metal, liquid at room temperature. Reactive.</p> <p>Atomic mass: 80</p>	<p>Krypton</p> <p>Colourless, odourless gas, doesn't react with anything</p> <p>Atomic mass: 84</p>

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