

MULTIPLE ELEMENTS IN SINGLE WORDS

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Here's a little piece of wordplay that I've been tinkering with for a while. It's something I've been able to dip into for a few minutes, and then come back to after a couple of hours, days or weeks later to see if I could make some improvements. If Word Ways readers can improve on any of my finds, do let the editor know. Right, here we go ...

Here's the initial problem simply stated: what's the shortest word from which the names of 2 chemical elements can be spelled out? There's no point in wrestling with long element names like PLATINUM or RUTHERFORDIUM – it's best to consider short element names. With that in mind, it's not hard to spot that IRON and TIN can both be spelled out, separately of course, from **INTRO**. There's also **XENON**, from which both NEON and XENON can be spelled out, but I don't like that because of XENON being repeated.

The poser can be generalised: what's the shortest word from which an increasing number of chemical element names can be spelled out? Here are some 3-element 7-letter solutions:

ADORING has ARGON, IRON and RADON
DIATRON has IRON, RADON and TIN
ORATING has ARGON, IRON and TIN

I had hoped to find an 8-letter word from which 4 element names could be spelled out, but my best solutions so far are for 9-letter words. Is there a 4-element 8-letter solution? If you can find one, please get in touch.

BACTERIUM has BARIUM, CERIUM, ERBIUM and TERBIUM
GRADATION has ARGON, IRON, RADON and TIN
RELOADING has ARGON, GOLD, LEAD and RADON

To find the shortest word containing 5 element names, I had to progress to a 10-letter word:

CUMBRAITES has BARIUM, CERIUM, CESIUM, ERBIUM and TERBIUM

Of course, you could swap the American spelling of CESIUM for the British spelling CAESIUM, but I don't think you can include both of them – after all, they are the same element. Can anyone find a 5-element solution in a word of fewer than 10 letters?

I was able to jump over a 6-element solution and go straight to a 7-element solution with an 11-letter word. Here's my best 7-element find:

BIMUCRONATE has BARIUM, CARBON, CERIUM, ERBIUM, IRON, TERBIUM and TIN

How about an 8-element solution? Here's my best solution so far, using a 12-letter word:

TURBINECTOMY has BROMINE, CERIUM, ERBIUM, IRON, TERBIUM, TIN, YTTERBIUM and YTTRIUM

But a 10-element solution is possible by choosing a different 12-letter word, thus:

TURBOMACHINE has BARIUM, BOHRIUM, BROMINE, CARBON, CERIUM, ERBIUM, IRON, TERBIUM, THORIUM and TIN

Going with one letter longer, I managed to add one further element, with this 11-element 13-letter solution:

UNPROBLEMATIC has BARIUM, BROMINE, CARBON, CERIUM, COBALT, ERBIUM, IRON, NOBELIUM, PLATINUM, TERBIUM and TIN

However, harking back to the earlier TURBOMACHINE, by simply pluralizing it with an S, I managed to add three more elements to come up with this 13-element 13-letter solution:

TURBOMACHINES has ARSENIC, BARIUM, BISMUTH, BOHRIUM, BROMINE, CARBON, CERIUM, CESIUM, ERBIUM, IRON, TERBIUM, THORIUM and TIN

Onwards and upwards! I haven't been able to find a good 14-element solution, but I have jumped straight to this 15-element 15-letter solution:

PULMOBRANCHIATE has BARIUM, BOHRIUM, BROMINE, CARBON, CERIUM, COBALT, ERBIUM, HELIUM, IRON, NOBELIUM, PLATINUM, RHENIUM, TERBIUM, THORIUM and TIN

Once again, simple pluralisation by the addition of an S generates an additional three elements, for this 18-element 16-letter solution:

PULMOBRANCHIATES has ARSENIC, BARIUM, BISMUTH, BOHRIUM, BROMINE, CARBON, CERIUM, CESIUM, COBALT, ERBIUM, HELIUM, IRON, NOBELIUM, PLATINUM, RHENIUM, TERBIUM, THORIUM and TIN

One letter longer and with 2 more elements is this 20-element 17-letter solution:

BRANCHIOPULMONATE has BARIUM, BOHRIUM, BORON, BROMINE, CARBON, CERIUM, CHLORINE, COBALT, ERBIUM, HELIUM, IRON, LANTHANUM, NEON, NOBELIUM, PLATINUM, POLONIUM, RHENIUM, TERBIUM, THORIUM and TIN

Yet again, the addition of an S provides us with a plural and another 3 elements, leading to this 23-element 18-letter solution:

BRANCHIOPULMONATES has ARSENIC, BARIUM, BISMUTH, BOHRIUM, BORON, BROMINE, CARBON, CERIUM, CESIUM, CHLORINE, COBALT, ERBIUM, HELIUM, IRON, LANTHANUM, NEON, NOBELIUM, PLATINUM, POLONIUM, RHENIUM, TERBIUM, THORIUM and TIN

Looking back on the solutions above, the TURBINECTOMY solution hasn't been extended. To improve on TURBINECTOMY, I needed to find a longer word containing all the letters of TURBINECTOMY, and then see what additional elements, if any, it allowed for. The only longer word containing all the letters of TURBINECTOMY appears to be INTERCOMMUNABILITY. This allows for 9 additional elements, so I now have a 17-element solution from this 18-letter word, thus:

INTERCOMMUNABILITY has ACTINIUM, AMERICIUM, BARIUM, BROMINE, CALCIUM, CARBON, CERIUM, COBALT, ERBIUM, IRON, NIOBIUM, NOBELIUM, TERBIUM, TIN, TITANIUM, YTTERBIUM and YTTRIUM

Clearly, the BRANCHIOPULMONATES solution (23 elements, 17 letters) is a superior solution. That's about as far as dictionary-listed words take me.

However, using a word not yet in dictionaries, but which can be found on the internet, with tens of thousands of Google hits, I managed to find this spectacular solution. There are 29 elements in this 22-letter word:

NANOBIOPHARMACEUTICALS has ACTINIUM, ARSENIC, BARIUM, BISMUTH, BOHRIUM, BORON, BROMINE, CALCIUM, CARBON, CERIUM, CESIUM, CHLORINE, COBALT, ERBIUM, HELIUM, IRON, LANTHANUM, LITHIUM, NEON, NIHONIUM, NIOBIUM, NOBELIUM, PLATINUM, POLONIUM, RHENIUM, SILICON, TERBIUM, THORIUM and TIN

Here's a brief explanation of NANOBIOPHARMACEUTICALS: Nanobiopharmaceutics is the application of nanotechnology into the world of medicine. It is an inter-disciplinary field involving the usage of nanoparticles to deliver biopharmaceutical products into the body. It involves knowledge from nanobiotechnology, biotechnology and biopharmaceutics. The different products so delivered are termed **nanobiopharmaceuticals**.

As the lengths of the 'solution' words presented above have increased, the numbers of elements contained in those words have increased. You might say that increasing the length of the solution word and/or increasing the number of its different letters will inevitably lead to an increased number of elements. But this isn't necessarily so, though. Consider the familiar isogram **DERMATOGLYPHICS** with its 15 different letters – this contains just 2 elements, GOLD and LEAD. Consider another familiar 15-letter isogram, **UNCOPYRIGHTABLE** – this contains a meagre 5 elements, ARGON, CARBON, COBALT, IRON and TIN. Thus, isograms aren't necessarily a route to finding multi-element solutions. How about really long words? The longest main entry in the Oxford English Dictionary is the 29-letter **FLOCCINAUCINIHLIPIILIFICATION** – it contains a solitary element, TIN. As with isograms, long words aren't an obvious route to finding solution words with multiple element names.

Key to finding solution words with multiple element names is to find groups of elements with several shared letters, and then attempt to add one or two letters at a time while expanding the number of elements in the solution word. Once I got beyond the 5-letter solutions, it was useful to note the overlap between ERBIUM and TERBIUM. Addition of an A brings in BARIUM, then adding a C captures CERIUM. Adding an S adds CESIUM (or CAESIUM, if you prefer). Then addition of N and O allows for the additional elements BROMINE, CARBON, IRON and TIN. So by now, I'm looking for solutions with the letters ABCEIMNORSTU. Adding an H will rope in BOHRIUM and THORIUM. And then adding an L will allow for CHLORINE, COBALT and HELIUM. I would suggest that we now have a group of 14 letters ABCEHILMNORSTU that will need to exist in any solution word that has at least 13 elements. COUNTERESTABLISHMENT is a good 20-letter example, but BRANCHIOPULMONATES is better still, with fewer letters (18) and the addition of a P and a second O.

Here are the solution words used in this article, briefly defined, with a dictionary source shown.

INTRO (a usually short introduction to something; the online Unabridged Merriam-Webster Dictionary - UMW)

ADORING (present participle of adore; UMW)

DIATRON (a type of electrical circuit; Collins English Dictionary)

ORATING (talking in a declamatory or impassioned manner; UMW)

BACTERIUM (a microorganism that typically lives in soil, water, organic matter, or the bodies of plants and animals; UMW)

GRADATION (a series of things forming successive stages or steps; UMW)

RELOADING (loading again; UMW)

CUMBRAITES (plural of CUMBRAITE, a type of rock; Webster's Second Edition – W2)

BIMUCRONATE (having two points; W2)

TURBINECTOMY (surgical removal of one or more turbinate bones; UMW)

TURBOMACHINE(S) (a machine of the nature of a turbine; W2)

UNPROBLEMATIC (not presenting puzzles or raising questions or doubts; UMW)

PULMOBRANCHIATE(S) (a book lung, as of a spider; UMW)

BRANCHIOPULMONATE(S) (a type of arachnid, such as a king crab; W2)

INTERCOMMUNICABILITY (the quality of being mutually communicable; UMW)

NANOBIOPHARMACEUTICALS (nanobiopharmaceutics is the application of nanotechnology into the world of medicine; it is an inter-disciplinary field involving the usage of nanoparticles to deliver biopharmaceutical products into the body; it involves knowledge from nanobiotechnology, biotechnology and biopharmaceutics; the different products so delivered are called nanobiopharmaceuticals)

DERMATOGLYPHICS (the science of the study of skin patterns; UMW)

UNCOPYRIGHTABLE (not able to be copyrighted; OED)

FLOCCINAUCINIHIPIPILIFICATION (the action or habit of estimating as worthless; OED)

Footnote:

Throughout this article I have used the names of elements as approved by IUPAC (the International Union of Pure and Applied Chemistry). I have ignored the Latin names used for some of the elements (for example, NATRIUM, STANNUM and STIBIUM) and I have also ignored old/earlier/suggested/preliminary names used for some of the elements (eg BRIMSTONE for SULPHUR/SULFUR, CELTIUM for HAFNIUM, and TYRIUM for NEODYMIUM). Many of these alternative names can also be spelled out from the solution words mentioned above, thereby increasing the total number of elements which can be spelled out. Most dramatically, the NANOBIOPHARMACEUTICALS list of additional elements includes these:

NANOBIOPHARMACEUTICALS also has ALABAMINE (suggested name for ASTATINE), ATHENIUM (proposed name for EINSTEINIUM), BRIMSTONE (old name for SULPHUR/SULFUR), CELTIUM (suggested name for the discredited discovery of HAFNIUM), NATRIUM (Latin name for SODIUM), NITON (former name for RADON), NORIUM (suggested name for the discredited discovery of HAFNIUM), POLICIUM (proposed name for DARMSTADTIUM), SPECTRIUM (suggested name for YTTERBIUM), and STIBIUM (Latin name for ANTIMONY)