Periodic table of elements pdf complete

In the late 19th century, Russian chemist Dmitry Mendeleev published his first attempt at grouping chemical elements according to their atomic weight. At the time, only about 60 elements were known, but Mendeleev realized that when the elements were organized by weight, certain types of elements occurred at regular intervals, or periods. Today, 150 years later, chemists officially recognize 118 elements (after the addition of four newcomers in 2016) and still use mendeleev's periodic table of elements to organize them. The table begins with the simplest atom, hydrogen, and then organizes the remaining elements by atomic number, which contains the number of protons. With a handful of exceptions, the order of elements corresponds to the increased mass of each atom. The table contains seven rows and 18 columns. Each row is a single period; the number of the period of the element indicates how many of its energy levels of the houses of electrons. Sodium, for example, sits in the third period, which means the sodium atom typically has electrons in the first three energy levels. Moving down the table, periods are longer because more electrons are needed to fill larger and more complex levels. Table columns represent groups or families of items. Elements in the group often look and behave similarly, because they have the same number of electrons in their outer shell — the face they show to the world. Elements of group 18, on the far right side of the table, for example, have completely full shells and are rarely involved in chemical reactions. Elements are generally classified as metallic or unmet, but the dividing line between them is fuzzy. Metal elements are usually good conductors of electricity and heat. Subgroups inside metals are based on similar characteristics and chemical properties of these collections. Our description of the periodic table uses commonly accepted groupings of elements, according to the Los Alamos National Laboratory. Alkali Metals: Alcali metals make up most of group 1, the first column of the table. Shiny and soft enough to cut with a knife, these metals start with lithium (Li) and end with a franc (Fr). They are also extremely reactive and will erupt in flames or even explode when in contact with water, so chemists store them in oils or inert gases. Hydrogen, with its only electron, also lives in group 1, but the gas is considered unmet. Alkalin-earth metals: Alkalin-earth metals make up 2 group periodic table, from merino (Be) through radii (Ra). Each of these elements has two electrons in its upper energy level, making alkaline land reactive enough that they are rarely found alone in nature. But they are not as reactive as alkal metals. Their chemical reactions tend to occur more slowly and produce less heat compared to alkaly metals. Enthanides: The third group is too long to fit into the third column, so it's broken flipped sideways to become the top row of the island, which floats at the bottom of the table. These are enthanides, elements from 57 to 71 — lathan (La) to luetium (Lu). Elements in this group have a silvery white color and overshadow when in contact with the air. Actinides: Actinides line the lower row of the island and consist of elements 89, akinium (Ac), through 103, lawrencium (Lr). Of these elements, only pectoral (Th) and uranium (U) are found naturally on Earth in significant volumes. They are all radioactive. Aktinids and enthanides together form a group called the inner transition of metals. Transition metals: Returning to the main body of the table, the remaining groups of 3 to 12 represent the rest of the transition metals. Solid but malleable, shiny and have good conductivity, these elements are what you usually think when you hear the word metal. It is home to many of the most prominent hits of the metal world — including gold, silver, iron and platinum. After metal transition: Ahead of the leap into the unmet world, the common characteristics are not neatly divided along vertical group lines. After the transition, the metals are aluminum (Al), gallium (Ga), indium (In), thallium (Tl), tin (Sn), lead (Pb) and bismuth (Bi), and they cover a group of 13 to group 17. These elements have some classic characteristics of transitional metals, but they tend to be softer and are conducted more poorly than other transition metals. In many periodic tables will be presented a bold staircase line under the diagonal connecting the boron with statins. Cluster after moving metals to the lower left corner of this line. Metaloids: Metaloids - a boron (B), silicon (C), germanium (Ge), soft (yek), anti-model (Sb), thekuriy (Te) and polonium (Po). They form a ladder that embodies a gradual transition from metals to non-metalists. These elements sometimes behave like semiconductors (B, Si, Ge) rather than as conductors. Metaloids are also called semi-metal or poor metals. Nonmetal: Everything else in the upper right corner of the staircase — plus hydrogen (H), stranded back in group 1 — is unmet. These include carbon (C), nitrogen (N), phosphorus (P), oxygen (O), sulfur (S) and selenial (Se). Halogens: The top four elements of group 17, from fluoride (F) through astatin (At), represent one of two subsets of non-metals. Halogens are quite chemically reactive and are usually paired with alkalene metals to produce different types of salt. Table salt in your kitchen, for example, is a marriage between meadow metallic sodium and halogen chlorine. Noble gases: Colorless, odorless and almost completely inactive, inert or noble gases round the table in group 18. Many chemists expect Oganesson, one of four recently named elements, to share these characteristics; however, since this element has a measurement of half-life in milliseconds, no one has been able to test it directly. Oganesson completes seventh period period so if anyone manages to synthesize element 119 (and the race to do so is already underway), it will cycle around to start row eight in the alkali metal column. Because of the cyclical nature created by the periodicity that gives the table its name, some chemists prefer to visualize Mendeleev's table as a circle. Additional resources: Each of the chemical elements has its own distinctive set of properties, making it cool in its own right. If you had to choose the coolest element, what would it be like? Here are some leading title contenders and the reasons why they're awesome. amandine45 / Getty Images Almost all radioactive elements are cool. Plutonium is particularly amazing because it really glows in the dark. However, plutonium's glow is not related to its radioactivity. The element is edified in the air, emitting red light like burning coal. If you were to hold a piece of plutonium in your hand (not recommended), it would feel warm thanks to the sheer amount of radioactive decay and edification. Too much plutonium in one place leads to a chain reaction of a fugitive, also known as a nuclear explosion. One interesting fact is that plutonium is more likely to be critical in solution than as solid. The symbol of the element for plutonium is Pu. Pee-Uu. Take it? Plutonium rocks. Natalie Fobs / Getty Images Carbon cool for several reasons. First, a lifetime as we know it is carbon-based. Every cell in your body contains carbon. It's in the air where you breathe and the food you eat. You couldn't live without it. It's also cool because of the interesting shapes that a clean element suggests. You come across pure carbon like diamonds, graphite in pencils, claws from combustion, and like those wild cage-shaped molecules known as fullerenes. Jrgen Wambach / EyeEm / Getty Images You usually think of sulfur as a yellow rock or powder, but one of the coolest things about this element is that it changes color in different settings. Hard sulfur is yellow, but melts into a blood-red liquid. If you burn sulfur, the flame is blue. Another neat thing about sulfur is that its compounds have a distinctive smell. Some might even call it that. Sulfur is responsible for the smell of rotten eggs, onions, garlic and scoung spray. If, there must be some sulfur. Bloomberg Creative Photos / Getty Images All the metal meadows react spectacularly in the water, so why did lithium make the list until the tsezium did it? Well, for one you can get lithium from batteries, while the tsezium requires special permission to obtain. For another, lithium burns with a hot pink flame. What's not to love? Lithium is also the lightest solid element. Before the flames erupt, this metal floats through the water. Its high reactivity means it also corroses your skin, so it's a touchless element. Lester V. Bergman / Getty Images Gallium is a silver metal that can be used to perform the magic trick of bending a spoon. You make a spoonful of metal, hold it between your fingers and the power of your mind to bend the spoon. Indeed, you use the warmth of your hand, not a superpower, but we will keep this little secret. Halium goes from solid to liquid just above room temperatures. The low melting point and resemblance to stainless steel makes the galia ideal for an endangered spoon trick. Gallium is also used to showcase the heart-beating gallium, which is a much safer version of the classic hem demonstration that uses mercury. Mercury.