Electrons neutrons and protons worksheet

Unit Objectives: I can differentiate between protons, neutrons, and electrons I can determine the number of protons, neutrons, and electrons in neutral atoms, ions, and isotopes I can read the periodic table and explain its layout, groups, and system of classification Test includes various sections, such as multiple choice, "Who am I," Draw atoms, and more.Page 2This maze has students reviewing chemistry content including finding the number of protons, neutrons, electrons, distinguishing between atomic number and atomic mass, properties of metals, non-metals, and metalloids, family names, groups versus periods, and element symbols. The questions are True/False style, leading students through the maze to the correct "END".Page 3One page editable worksheet can be used as a preview, review, assessment, etc. Define-Matter, Atom, Nucleus, Proton, Neutron, Electron, Spectral Line, Energy Level, Electron Cloud, Element, Atomic Number, Mass Number, Isotope, Average Atomic Mass, Ion.Understanding Concepts1) Illustrate an atom. Include protons, electrons, and neutrons. 2) Compare the mass, location, and charge of the three basic particles of an atom. 3) List Dalton's three observations. 4) Illustrate Thomson's, Rutherford's, anPage 4Periodic Table handout for students to practice finding information of the Periodic Table: Symbols, Atomic Number, Atomic Mass, Protons, Neutrons, Electrons, Metals, Metalloids, Nonmetals, Solids, Liquids, Gases. Answer sheet included.Page 5This powerpoint can be used as a review of the periodic table. This powerpoint includes charts containing the element name, the element symbol, the proton number, the neutron number, the electron number, and isotopes. Students will complete the blank spaces of the chart and the next slides will have the correct answers for review. This presentation also includes 28 review questions with answers. Questions will quiz the students on the location of elements, symbols, periods, groups, etc. ThisPage 6This bingo game includes the following terms: physical properties, matter, mass, weight, volume, density, balance, graduated cylinder, meniscus, solid, liquid, gas, freezing, melting, boiling, sublimation, molecule, solubility, chemical change, reactivity, atom, proton, electron, neutron, nucleus, atomic number, compound.Page 7This easy-to-play game is a great way to practice essential biological concepts. This pdf contains words concerning the chemistry basis of life unit for Biology I classes. Words include: ATP, nucleic acids, proteins, lipids, carbohydrates, catalyst, activation energy, enzymes, pH, acid, base, proton, neutron, ion, valence electrons, and more!Page 8Watch a short Video Preview With this FREE product, your students will love coloring, cutting out, and assembling these 3D atomic models of the first 10 elements to make a beautiful and lasting display for your classroom. Each atomic model comes with it's own information tag including element symbol, properties and uses, atomic number, atomic mass, and much more. From this information tag students determine the number of protons, neutrons, electrons, and the electron configuration for each atoPage 9Bring engaging and interactive activities into your classroom with these science notebook pages. This resource contains 9 FREE interactive notebook templates - one from each of the following bundles: Safety and the Scientific Method, Force and Motion, Ecosystems, Chemistry, Earth, Structure of Life, Space, Energy, and Weather. Interactive notebooks are the perfect tool to use within your classroom. These activities are great to use for vocabulary practice, concept reinforcement, independent sPage 10Semester B Unit VI guideline with activator questions; objectives and a general timeline on lessons. Terms may include: Electromagnetic waves, radio waves, infrared rays, ultraviolet rays, x rays, gamma rays, wavelength, frequency, spectrum, blackbody radiation, Doppler effect, redshift / blueshift, transverse and radial velocity Emission lines, absorption lines, ground state / excited states, photons or quanta Core, radiation zone, convection zone, photosphere, chromosphere, transition zone, About the same time as Thomson's experiments with cathode rays, physicists such as by Henri Becquerel, Marie Curie, Pierre Curie, and Ernest Rutherford were studying radioactivity. Radioactivity was characterized by three types of emitted rays (see How Radioactivity Works for details):Alpha particles - positively charged and massive. Ernest Rutherford showed that these particles were the nucleus of a helium atom.Beta particles - negatively charged and light (later shown to be electrons).Gamma rays - neutrally charged and no mass (i.e., energy).The experiment from radioactivity that contributed most to our knowledge of the structure of the atom was done by Rutherford and his colleagues. Rutherford bombarded a thin foil of gold with a beam of alpha particles and looked at the beams on a fluorescent screen, he noticed the following:Most of the particles went straight through the foil and struck the screen.Some (0.1 percent) were deflected or scattered in front (at various angles) of the foil, while others were scattered behind the foil.Rutherford concluded that the gold atoms were mostly empty space, which allowed most of the alpha particles through. However, some small region of the atom must have been dense enough to deflect or scatter the alpha particle. He called this dense region the nucleus (see The Rutherford Experiment for an excellent Java simulation of this important experiment!); the nucleus comprised most of the mass of the atom. Later, when Rutherford bombarded nitrogen with alpha particles, a positively charged particle that was lighter than the alpha particle was emitted. He called these particles protons and realized that they were a fundamental particle in the nucleus. Protons have a mass of 1.673 x 10-24 grams, about 1,835 times larger than an electron!However, protons could not be the only particle in the nucleus because the number of protons in any given element (determined by the electrical charge) was less than the weight of the nucleus. Therefore, a third, neutrally charged particle must exist! It was James Chadwick, a British physicist and co-worker of Rutherford, who discovered the third subatomic particle, the neutron. Chadwick bombarded beryllium foil with alpha particles and noticed a neutral radiation coming out. This neutral radiation could in turn knock protons out of the nuclei of other substances. Chadwick concluded that this radiation was a stream of neutrally charged particles with about the same mass as a proton; the neutron has a mass of 1.675 x 10-24 grams.Now that the parts of the atom were known, how were they arranged to make an atom? Rutherford's gold foil experiment indicated that the nucleus was in the center of the atom and that the atom was mostly empty space. So, he envisioned the atom as the positively charged nucleus in the center with the negatively charged electrons circling around it much like a planet with moons. Although he had no evidence that the electrons circled the nucleus, his model seemed reasonable; however, it presented a problem. As the electrons moved in a circle, they would lose energy and give off light. The loss of energy would slow the electrons down. Like any satellite, the slowing electrons would fall into the nucleus. In fact, it was calculated that a Rutherford atom would last only billionths of a second before collapsing! Something was missing! This article was updated June 28 at 4:54 p.m. ET.Scientists have long wondered whether there is a limit to the number of protons and neutrons that can be clustered together to form the nucleus of an atom. A new study comes closer than ever to finding the answer by estimating the total number of nucleus variations that can exist.The periodic table of elements includes 118 known species of atoms, and each of these exists (either naturally or synthetically) in several versions with differing numbers of neutrons, giving rise to a total of about 3,000 different atomic nuclei. As technology has improved over the years, physicists have been building heavier and heavier atoms — element 117 was created only last year, and researchers are hot on the trail of 119. New projects are in the works to add and subtract neutrons to known elements to create ever more exotic variations, known as isotopes.But where does it end?In a paper published in tomorrow's (June 28) issue of the journal Nature, researchers report that roughly 6,900 nuclides (variations of atomic nuclei), plus or minus 500, should be possible. [Infographic: Nature's Tiniest Particles Dissected]Nuclear binding"Beyond the 7,000, we are talking about nuclides whose lifetimes can be so short that they can't form," said research team member Witold Nazarewicz of the University of Tennessee, the Oak Ridge National Laboratory in Tennessee and Warsaw University in Poland. "The system would decay instantly."Even within those 7,000, the vast majority would be unstable, lasting only a tiny fraction of a second. Of the 3,000 known nuclides, only 288 are stable.Atoms are limited in the number of protons they can contain, because each proton is positively charged, and because "like repels like," they want to push each other away. Even neutrons, which have no charge, are slightly repulsive to each other. A mysterious force called the strong interaction, which is about 100 times stronger than electromagnetism, is what binds protons and neutrons together in nuclei."The nature or the exact form of the strong force, especially in heavier nuclei, is still a subject of very intense experimental and theoretical research," Nazarewicz told LiveScience. [Top 10 Unexplained Phenomena]To create the new estimate, Nazarewicz and his colleagues, led by Jochen Erler of the University of Tennessee and Oak Ridge, examined what's called the drip line, a theoretical boundary on the number of neutrons that can be combined with a given number of protons to form a nucleus. (The idea is that if more neutrons are added beyond this line, they will "drip," or fall out, from the nucleus.)To plot out the drip line, the researchers extrapolated from the best available models of nuclear interactions in heavy nuclei. By including various models, the scientists were able to estimate the first reliable error bars on their predictions, showing just how precise the estimate is."This is the first study which really gave an error bar and showed what is the best theoretical guess for this limit," Nazarewicz said. "It is not enough that you provide a number. You need to provide a number with [an estimate of the] uncertainty."Supernovas and neutron starsThe new estimate isn't just a theoretical quantity — the number would represent all the possible species that might be created inside astrophysical phenomena, such as supernova explosions or neutron star mergers.In these extreme situations, an excess of neutrons is created, and many of these neutrons can be captured by atomic nuclei, creating new nuclides. Often a process called beta decay will occur, in which a neutron turns into a proton by releasing both an electron and a minuscule particle called a neutrino. This allows the creation of not just heavier isotopes of existing elements, but new, heavier elements with more protons per atom. In fact, most of the elements heavier than iron found in the universe were created in supernovas.The team's findings could be put to practical use when a new facility called the Facility for Rare Isotope Beams opens around 2020 at Michigan State University. The project is designed to synthesize many of the radioactive, weakly bound nuclei that have been predicted but never seen, in order to map out some of the unexplored territory in the nuclear landscape."Remarkably, we don't what combinations of neutrons and protons can make an atomic nucleus. We are not sure how many elements can ultimately exist, or generally for each element how many isotopes are possible," FRIB chief scientist Brad Sherrill, who was not involved in the new study, wrote in an email. "The current work is groundbreaking because it not only makes a solid prediction for how many, but also gives a good estimate of the errors in that guess. While the error band looks reasonable, we still are likely to find surprises, and it will be great to use facilities like FRIB to check these predictions. The only thing I am willing to bet is that there will be surprises along the way."Scientists are hoping FRIB will be able to create new elements — that is, nuclei with more than 118 protons — in addition to new isotopes of the known elements."How many new elements can we create? We don't know," Nazarewicz said.Follow Clara Moskowitz on Twitter @ClaraMoskowitz or LiveScience @livescience. We're also on Facebook & Google+.

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