I'm not a bot

0 ratings0% found this document useful (0 votes)266 viewsSaveSave Atomic Theory Model Worksheet and Answer Key For Later0%0% found this document useful, undefined Atoms consist of a nucleus and electrons. The structure of atoms is essential to understand their properties and how they combine with other atoms to form bonds. These worksheets are designed such that students can use their knowledge of atomic structure to answer questions on atomic properties. A few questions also test students on the history and discovery of the atom. Suitable for:Grade 7, Grade 8, Grade 9, Grade 10, Grade 11, Grade 12 Download PDFSupport your learners to develop mental models and deepen understanding of the structure of the atomThis worksheet is part of theJohnstones triangle seriesof resources, designed to help learners to move between different conceptual levels of thinking in key chemistry topics. Developing understanding worksheet A ramped worksheet to help learners develop their mental models of the structure of the atom. With icons to indicate the conceptual level/s of each question. Use atomic number and mass number to work out the number of different sub-atomic particles in one atom. Label the different parts of an atom as represented using the atomic model. Use an atomic structure diagram to interpret a metallic bonding diagram. Use appropriate models of the atom to create explanations. This resource aims to develop learners understanding of the structure of the atom. The questions encourage learners to think about different representations of atomic structure and what those representations mean at the sub-microscopic level. As a result, learners should develop more secure mental models to support their thinking about this topic. When to use?Use after initial teaching or discussion of this topic to develop ideas further. You can also use as a revision activity. Group size?Suitable for independent work either in class or at home. Or use the questions for group or class discussions. How long?1530 mins Johnstones triangle Johnstones triangle is a model of the three different conceptual levels in chemistry: macroscopic, symbolic and sub-microscopic. You can use Johnstones triangle to build a secure understanding of chemical ideas for your learners. Introduce learners to Johnstones triangle with ourAtomic structure of lithium Johnstones triangle worksheetwhich guides learners to think about the sub-atomic particles that make up a Lithium atom. Johnstones triangle and this resource The icons in the margin indicate which level of understanding each question is developing to help prompt learners in their thinking. Macroscopic:what we can see. Think about the properties that we can observe, measure and record. Sub-microscopic:smaller than we can see. Think about the particle or atomic level. Symbolic:representations. Think about how we represent chemical ideas including symbols and diagrams. The levels are interrelated, for example, learners need visual representation of the sub-microscopic in order to develop mental models of the particle or atomic level. Our approach has been to apply icons to questions based on what the learners should be thinking about. Questions may be marked with two or all three icons, indicating that learners will be thinking at more than one level. However, individual parts of the question may require learners to think about only one or two specific levels at a time. Support This worksheet is ramped so that the earlier questions are more accessible. The activity becomes more challenging in the later questions. You can give extra explanations for the more challenging questions. If completing as an in-class activity it is best to pause and check understanding at intervals, as often one question builds on the previous one. It is useful for learners to observe macroscopic properties first-hand. You could circulate examples of substances in the classroom, run a class practical of a chemical reaction or show a teacher demonstration of properties. Give learners physical models to use and manipulate, such as a Molymod kits or counters. Additional support may be needed for any learners still lacking in confidence in the required symbolic representation, for example by sharing and explaining a diagram or a simulation that can show movement of the particles. Answers and guidance There are three multi-part questions in the student worksheet. The first question consolidates learners understanding of the different types of each sub-atomic particle and how the number of each can be worked out from the atomic number and mass number.Question twodevelops learners understanding of the connection between the charge of individual particles, the overall charge of the nucleus and the whole atom (sub-microscopic understanding) and the type of force between the nucleus and electrons. Question 3 develops learners understanding of how helium can be represented by both the particle model and atomic model (symbolic understanding) and asks them to consider which model can best explain(sub-microscopic understanding) physical properties of helium (macroscopic understanding), encouraging students to consider the strengths of each model and the importance of using the most appropriate model to explain a given phenomenon. More resources for teaching atomic structure Support students to retrieve information on the model of the atom and subatomic particles whilst scaffolding independent writing using a structure strip. Boost learners confidence drawing electron configurations with an infographic to download and display on your classroom walls. Use the approaches in this article to ensure your learners develop good mental models of the atom and avoid common misconceptions. Report this resourceto let us know if it violates our terms and conditions. Our customer service team will review your report and will be in touch. Basic facts to get us started. An example question would be: Which of the following terms refers to the smallest part of a compound that has all the properties of that compound? We peek into the true anatomy of these buggers. Every atom (except the hydronium ion) has two main components, a NUCLEUS with PROTONS and NEUTRONS and one or more ORBITS (or SHELLS) that contain one or more electrons. You are given an element or ion name and an atomic number. We ask you to tell us about what it composed of. An atom is composed of protons, neutrons, and electrons. The protons and neutrons are found in the nucleus. The electrons are found in the electron cloud, which is an area that surrounds the nucleus. Example problem: What is the mass number, symbol, and charge of an ion that contains 35 protons, 45 neutrons and 36 electrons? We are looking for a wide range of data based on the information that is provided to you about an element or ion. You will give 3 pieces of data and are asked to complete this here chart for us. The data given may include element name, symbol, atomic number, number of sub atomic-particles (protons, electrons, neutrons), and any charge that may exist. Show us where the electrons are located. Write the complete electron configuration for each of the following elements. Identify the element that corresponds to each of the following electron configurations. It is stated in orbital notation. Draw orbital diagrams for the following choices. You will across note the directionals. Given an element and a mass number you will tell us the number of protons, electrons, and neutrons. You will also diagram the electron configuration in an orbital diagram. The electrons found in the outer most energy level are collectively referred to as valence electrons. Lewis Dot Diagrams are used to indicate the number of valence electrons and provide us with a quick form of short hand. Given an element, like Magnesium (Atomic Number 12, Mass Number 24), please provide all the following information for this element. For identified element identify the ground state electron configuration, orbital diagram, Lewis dot diagram, and number of valence. Place a check in the correct box to indicate the classification of each form of matter. All of the substances described uses common names that most people will recognize. You will be given chemical symbols for elements, compounds, or a mixture and asked to state the phase of matter you find this at room temperature. Place a check to identify the form of radiation demonstrated by each reaction below. Predict the products of the following nuclear reactions. You may need to balance a reaction or two. What is going on with these nuclear reactions? What reactants were needed to create these products. Radioactive substances decay at a constant rate. There are a number of unstable nuclei that decay in a given time. The time that it takes for half of the atoms in a given sample of an element to decay is termed the half-life. For questions 1 and 2 predict the missing reactant or product and identify the form of radiation demonstrated in each problem. Write the electron configuration, orbital diagram, total number of valence electrons, and Lewis dot structure. This is the 3rd page of this quiz in this series. The questions center around naming elements, compounds, and mixtures. You will also balance nuclear reactions. This portion of the quiz is all situational types of word problems. You will test your knowledge once again using all that you have learned. Identify the element that corresponds to each of the following electron configurations. This page tests your ability to write Lewis Dot diagrams and determine the total number of valence electrons. This will test two skills: 1) Your ability to indicate if the item presented is an element, compound, or mixture. 2) Balancing chemical reactions and missing parts. All the questions on this page are about determining the half life of substances. This may look a bit different than others. Label all the parts and tell us what we know about this particular atom based on the sub-atomic particle arrangement. Charge it all up. This is very similar to the last worksheet, but it is flat. Using the model key for each element, write the chemical formula for each molecule. We do the same thing as the last worksheet, but we go in the opposite direction. It is pretty cool how you can do that. What is missing in here? Make sure to check the entire table. Use the legend and key to help you. Find those different elements and parts. Same as the last worksheet, but you will see some different missing parts The element you want to see is missing. Can you determine everything that is missing? The number of protons is the atomic number and the mass number is the sum of the protons and neutrons. The electrons in a neutral atom equal the number of protons. You will use this to complete this worksheet. Bohr models (or Bohr diagram) are diagrams that show the number of protons and neutrons in the nucleus and the electrons in each electron energy level around it. Provide the number of atoms in each molecule of the substances represented by the chemical formulas below. What Are Atoms and What is Their Significance? An atom is one of the most significant things in the world as it is the smallest unit of matter. When one atom connects with another atom, they make up a chemical element. Atoms were initially thought to be the smallest particle of matter, but they are actually composed of three smaller particles. The atom is the unit of matter that forms all elements in the universe. The parts of the atom are the proton, neutron, and electron. The protons and neutrons inhabit the atoms nucleus (or center), while electrons spin around the outside of the nucleus. Every living thing is made of atoms. Since atoms are part of all living and non-living things, they are crucial to scientific study. Read on to learn the three primary parts of an atom, the most common atoms, and how the Periodic Table identifies elements by the number of atoms. What is An Atom? The word "atom" is derived from a Greek word for "uncuttable". Atoms are thought to be the smallest particle of a single element. There are smaller parts of it, but the makeup and arrangement does determine the properties of an element. It is pretty cool because how we mix up atoms up or together can make just about anything in the universe. You find three simple sub-atomic particles in each atom. In the center (nucleus) you will find neutrons and protons. Together they provide almost all of the mass for the element. Protons have a positive charge and neutrons have no charge. Spinning around the nucleus you will find electrons. They have a negative charge and provide very little mass to the overall element. Atoms are essential pieces of matter, with matter being anything you can physically touch. The only thing in the world not made of atoms is energy. Atoms can connect to form molecules, and molecules form all the physical world you see. Atoms have three parts that work together. The protons carry a positive charge, while the electrons have a negative charge. The neutrons have no charge. All atoms have the same number of protons and electrons, and most atoms have the same number of protons and neutrons. The significance of atoms is that without them, nothing could exist. They are the building blocks of all chemical structures. When atoms combine, they create individual compounds that are part of the universe. The Four Most Common Atoms The four most common atoms are nitrogen, oxygen, carbon, and hydrogen. In all, there are over one hundred discovered atoms. Lets learn some interesting facts about these common atoms and how they impact the world around us. Hydrogen is the simplest element and comprises two of the same atoms. It is a colorless, weightless gas. Hydrogen is in water and comprises sixty-one percent of the human bodys atoms. Carbon atoms can link together to make some of the longest, most durable chains. Carbon can form limitless molecules that vary in size, composition, and shape. It is the only element with a field of chemistry focusing only on its compoundsorganic chemistry. Oxygen is a tasteless, odorless gas that all living things need for breathing. Oxygen is the third most plentiful element, with hydrogen being the most abundant and helium being second. Nitrogen is the fourth most common atom, making up about seventy-five percent of the Earths atmosphere. It is also an odorless, tasteless, colorless gas and is the fifth most plentiful element in the universe. The Relationship Between the Periodic Table And Atoms The Periodic Table is a chart of chemical elements (made up of atoms) organized into rows where elements with a similar structure are grouped together. The name of the chart comes from the arrangement of the elements. The rows from left to right are termed periods, while the rows from top to bottom are called groups. There are one hundred and eighteen elements on the table and scientists will add two more soon. Why Atoms Have Atomic Numbers on the Periodic Table The atoms in each unique element have a specific number of protons. For example, oxygen has two atoms so its atomic number is 2. Iron has twenty-six protons in its nucleus so the atomic number is 26. Scientists can identify an element by its atomic number on the chart. Conclusion Atoms, the tiniest unit of matter, make up all things. Considering that all living and non-living matter are made up of atoms, this is a significant concept to understand for scientific study.

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