Ionic bonding worksheet high school pdf free version online download

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A molecule or compound is made when two or more atoms form a chemical bond, linking them together. The two types of bonds are ionic bonds and covalent bonds. The distinction between them has to do with how equally the atoms participating in the bond share their electrons. In an ionic bond, one atom essentially donates an electron to stabilize the other atom. In other words, the electron spends most of its time close to the bonded atom. Atoms that participate in an ionic bond have different electronegativity values from each other. A polar bond is formed by the attraction between oppositely-charged ions. For example, sodium and chloride form an ionic bond, to make NaCl, or table salt. You can predict an ionic bond will form when two atoms have different electronegativity values and detect an ionic compound by its properties, including a tendency to dissociate into ions in water. In a covalent bond, the atoms are bound by shared electrons. In a true covalent bond, the electronegativity values are the same (e.g., H2, O3), although in practice the electronegativity values just need to be close. If the electron is shared equally between the atoms forming a covalent bond, then the bond is said to be nonpolar. Usually, an electron is more attracted to one atom than to another, forming a polar covalent bond. For example, the atoms in water, H2O, are held together by polar covalent bonds. You can predict a covalent bond will form between two nonmetallic atoms. Also, covalent compounds may dissolve in water, but don't dissociate into ions. Here's a quick summary of the differences between ionic and covalent bonds, their properties, and how to recognize them: Ionic Bonds Covalent Bonds Description Bond between metal and nonmetal. The nonmetal attracts the electron, so it's like the metal donates its electron to it. Bond between two nonmetals with similar electronegativities. Atoms share electrons in their outer orbitals. Polarity High Low Shape No definite shape Definite shape Melting Point High Low Boiling Point High Low State at Room Temperature Solid Liquid or Gas Examples Sodium chloride (NaCl), Sulfuric Acid (H2SO4) Methane (CH4), Hydrochloric acid (HCl) Chemical Species Metal and nometal (remember hydrogen can act either way) Two nonmetals Do you understand? Test your comprehension with this quiz. The two main types of chemical bonds are ionic and covalent bonds. An ionic bond essentially donates an electron to the other atom participating in the bond, while electrons in a covalent bond are shared equally between the atoms. The only pure covalent bonds occur between identical atoms. Usually, there is some polarity (polar covalent bond) in which the electrons are shared, but spend more time with one atom than the other. Ionic bonds form between a metal and a nonmetal. Covalent bonds form between two nonmetals. Maplesoft™, a subsidiary of Cybernet Systems Co. Ltd. in Japan, is the leading provider of high-performance software tools for engineering, science, and mathematics. Its product suite reflects the philosophy that given great tools, people can do great things. Learn more about Maplesoft. The requested URL was not found on this server. Additionally, a 404 Not Found error was encountered while trying to use an ErrorDocument to handle the request. Apache/2.4.41 (Ubuntu) Server at sourcing.gftn.panda.org Port 443 Oops, the page you're looking for Disappeared At the end of this chemical bonding lesson plan, students will be able to describe how elements form bonds, investigate how valence electrons relate to chemical bonds, and differentiate between ionic and covalent bonding. Each lesson is designed using the 5E method of instruction to ensure maximum comprehension by the students. The following post will walk you through each of the steps and activities of the chemical bonding lesson plan. ENGAGEMENT Objective Introduction At the beginning of the lesson, the class will do a Think-Pair-Share to discuss the objective. Class Activity Write these words on the board: Ionic Bonds Covalent Bonds Show the animated video – The Chemical Bonds Song. The link is provided. Explain to students they will be taking notes during the video. Student Activity Have students break up into small groups. In each group, have students discuss and compare their notes with each member of the group. Have students try to explain Ionic Bonding. Have students try to explain Covalent Bonding. Play the song again to allow students an opportunity to add to their explanations of both bond types. The teacher will help to clear any misconceptions about chemical bonding. A major misconception is students may think they can acquire dichotomous classification of bonds readily, but fail to understand that bonding is primarily an electrical phenomenon. This is an area where helping students to appreciate that our descriptions and diagrams are just models will make learning easier. Estimated Class Time for the Engagement: 20-30 minutes EXPLORATION This student-centered station lab is set up so students can begin to explore chemical bonding. Four of the stations are considered input stations where students are learning new information about chemical bonding, and four of the stations are output stations where students will be demonstrating their mastery of the input stations. Each of the stations is differentiated to challenge students using a different learning style. You can read more about how I set up the station labs here. EXPLORE IT! Students will be working in pairs to identify the types of chemical bonds. Students will follow the directions on the task cards and use manipulatives to show how valence electrons in atoms combine to form chemical bonds. Students will be demonstrating the bonds of H2O and NaCl. Throughout the process, task cards will continue to assist students to understand the differences between ionic and covalent bonds. WATCH IT! At this station, students will be watching a nine-minute video explaining the differences between covalent and ionic bonding. Students will then answer questions related to the video and record their answers on their lab station sheet. For example, what are the differences between covalent and ionic bonds? Describe the octet rule. What type of bonds would be in CO2? RESEARCH IT! The research station will allow students to explore an interactive webpage that has students take a scientific approach to understanding chemical bonds. Students will be instructed to complete a few tasks and record answers on their lab sheets. READ IT! This station will provide students with a one page reading about why are bonds important. In the reading, students will discover many forms of chemical bonds, what happens when chemical bonds break, and examples of energy production. There are 4 follow-up questions that the students will answer to show reading comprehension of the subject. ASSESS IT! The assess it station is where students will go to prove mastery over the concepts they learned in the lab. The questions are set up in a standardized format with multiple choice answers. Some questions include: What type of bonds are shown in the pictures? Which two elements are most likely to bond with each other? Fill in the blank: ____ bonds share valence electrons with other atoms. WRITE IT! Students who can answer open-ended questions about the lab truly understand the concepts that are being taught. At this station, the students will be answering three task cards to describe the valence electrons in nitrogen and how it could bond to other atoms. Students will also answer in their own words how are ionic bonds are different from covalent bonds, and why atoms are attracted to each other in an ionic bond. ILLUSTRATE IT! Your visual students will love this station. Students will draw two diagrams to show how atoms bond with each other to create chemical molecules. Students will identify the diagrams as either a covalent bond or ionic bond. ORGANIZE IT! The organize it station allows your students to manipulate cards in the correct column by whether the information is describing that of covalent bonds or ionic bonds. Estimated Class Time for the Exploration: 1-2, 45 minute class periods EXPLANATION The explanation activities will become much more engaging for the class once they have completed the exploration station lab. During the explanation piece, the teacher will be clearing up any misconceptions about chemical bonding with an interactive PowerPoint, anchor charts, and interactive notebook activities. The chemical bonding lesson includes a PowerPoint with activities scattered throughout to keep the students engaged. The students will also be interacting with their journals using INB templates for chemical bonding. Each INB activity is designed to help students compartmentalize information for a greater understanding of the concept. The chemical bonding INB template allows students to focus their notes on identifying the differences between covalent and ionic bonds.Estimated Class Time for the Exploration: 2-3, 45 minute class periods ELABORATION The elaboration section of the 5E method of instruction is intended to give students choice on how they can prove mastery of the concept. When students are given choice the ‘buy-in’ is much greater than when the teacher tells them the project they will have to create. The elaboration project will allow students to create a presentation to teach about chemical bonding.Estimated Class Time for the Elaboration: 2-3, 45 minute class periods (can also be used as an at-home project) EVALUATION The final piece of the 5E model is to evaluate student comprehension. Included in every 5E lesson is a homework assignment, assessment, and modified assessment. Research has shown that homework needs to be meaningful and applicable to real-world activities in order to be effective. When possible, I like to give open-ended assessments to truly gauge the student’s comprehension. Estimated Class Time for the Elaboration: 1, 45 minute class period DOWNLOAD THE FULL LESSON NOW The full lesson is available for download from my TpT store. Save yourself a ton of time and grab it now.

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