DOWNLOAD PDF ACID BASE DEFINITION WORKSHEET

Chapter 1 : Introduction to Acids and Bases (Worksheet) - Chemistry LibreTexts

The Arrhenius definition of acids and bases is one of the oldest. An Arrhenius acid is a substance that when added to water increases the concentration of H + ions present.

You should try to answer the questions without referring to your textbook. If you get stuck, try asking another group for help. Mencken Introduction Originally the terms acid and base referred to taste. The practice of classifying substances according to their acidic sour or basic alkaline or bitter properties dates back to ancient times. An acid was something with a sour taste, such as lemon juice, and a base was something with a bitter taste, such as tonic water. Today there are three additional categories of taste: The newest, umami, is specific to mono sodium glutamate MSG. It is no coincidence that the acidâ€"base properties of compounds are related to taste. Human taste receptors coupled with smell receptors have evolved to interpret certain molecular features as different tastes. Compounds formed from combinations of acids and bases taste salty and are referred to in chemistry as salts. Sweet compounds have characteristics of both acids and bases in the same molecule. We will explore the relationship between molecular structure and acidsâ€"bases, and consider water solutions of acids and bases. Thus the properties of an acid solution are due to the relatively high concentration of hydrogen ion, and the properties of basic solutions are due to the high concentration of hydroxide ions. As do many of the fundamental ideas in chemistry, the acidâ€"base concept dates back to ancient times and derives from everyday observations about substances people encountered. It was centuries later, however, before molecular interpretations were given to these real-life observations. The acidâ€"base concept is a system of classifying chemical substances which permits both the organization as well as the prediction of a vast number of chemical reactions. A substance may be assigned to one our four conceivable categories. It may be an acid or a base, but in addition, it may be both an acid and a base or it may be neither an acid nor a base. Early chemists realized that even among acids and bases, some acids were stronger more sour or more basic more bitter than others. Thus acids may be further classified as strong acids and weak acids, and bases as strong bases and weak bases. Three Definitions of Acids and Bases Arrhenius The Arrhenius definition of acids and bases is the oldest of the three with which you should be familiar. It is interesting that he first proposed this idea as a student but his professors considered the idea to be nonsense. As a result he nearly failed to earn the doctorate. He stuck to his convictions, however, and earned a Nobel Prize nineteen years later for this very same insight. An Arrhenius acid is a hydrogen-containing substance which yields hydrogen ions in aqueous solution. An Arrhenius base is a hydroxyl-containing substance which yields hydroxide ions in aqueous solution. It is obvious from the definitions that for a substance to be an acid in the Arrhenius sense, it must have at least one hydrogen atom, and to be a base, it must have at least one hydroxyl group. Moreover, the Arrhenius definitions only apply to the behavior of substances in water. A substance which yields hydrogen ions is a proton donor, and a substance containing a hydroxyl group which is capable of yielding hydroxide ions in aqueous solution would also be a proton acceptor. Lewis The Lewis definition is the most general of the three. It liberates the acidâ€"base concept from its reliance on the presence of any particular element. It focuses on the behavior of the electrons during an acidâ€"base reaction. The importance of the Lewis definition is that it gets at the basis of acidâ€"base behavior and catalogues the largest number of molecules and reactions. A Lewis acid is an electron pair acceptor; a Lewis base is an electron pair donor. By reversing the reaction in which a substance acts as a proton donor, we see that the product is itself a proton acceptor. It is thus a base, or more specifically, it is the conjugate base of the original acid. It is thus the conjugate acid of the original base. Atomic charge is the charge usually a fraction that an atom or group of atoms carries when it is in a molecule. All of the atomic charges in a species must add up to the charge on that species. Atomic charges are important because the charge on an atom in a molecule is its optimal charge. In a reaction if this charge is to be increased or decreased, energy must be supplied. Generally, chemical species that are positively charged are acidic; negatively charged are basic. Electronegativity is the ability of an atom to attract electrons to itself in a bond. Thus atoms of high electronegativity will acquire excess negative charge electrons and will thus have negative atomic charges. They will tend to be bases. On the other hand, atoms of

lower electronegativity will then have lost negative chargeâ€”electronsâ€”and will have positive atomic charges. They will tend to be acids. A lone pair or free pair of electrons is a pair of electrons which are in the same orbital. They do not participate in bonding in the molecule. However, they may form a bond with another chemical species that is positively charged, and in so doing act as a base. A functional group is an atom or group of atoms that has a specific arrangement in an organic molecule. The type of functional group relates to certain chemical properties of that molecule. For example, the â€”COOH group is referred to as a carboxylic acid. This functional group is the source of acidity in organic acids. Another functional group, the amine, has a nitrogen with a free pair of electrons and behaves as a base. It is a scale from 0 to The pH scale was developed by a Belgian brewmaster to control the quality of his product. The Water Equilibrium A critical concept in understanding acid-base behavior Pure water is mostly made up of water molecules, but it also consists of very tiny quantities of hydrogen and hydroxide ions in equal amounts. These result from the spontaneous, natural autoionization of water: It is assigned the symbol Kw to indicate that it is the equilibrium constant for the autoionization of water: Since the dissociation of one water molecule yields one hydrogen ion and one hydroxide ion, their concentrations must be equal in pure water. This allows the calculation of each: Such solutions will still follow Equation The pH Scale Working with the tiny numbers associated with hydrogen ion and hydroxide ion concentrations in solutions can be awkward. This allows concentrations to be expressed as numbers that generally range between 1 and The concentration of the undissociated acid, HX, is much greater than the concentrations of hydrogen ion and the conjugate base of the weak acid, Xâ€”. Therefore, weak acid equilibrium constants have values less than one. The weaker the acid, the smaller the value of the equilibrium constant. Ka values for many common weak acids are available in reference books and general chemistry textbooks. Another important concept arises from the fact that weak acids dissociate only slightly: The amount of weak acid that ionizes is usually negligible when compare with its initial concentration. To illustrate, consider a 0. If this acid is 2. Applying the rules of significant figures, 0. Thus, you can see that the amount that ionizes is not significant, and the initial acid concentration essentially is unchanged by the dissociation. The concentrations of hydrogen ion and conjugate base of the weak acid cannot be neglected in weak acid equilibria. In fact, determining these concentrations is frequently the goal of theoretical calculations and experimental investigations of weak acid solutions.

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Chapter 2 : Acids and Bases - Easy Science For Kids

The BrÃ¸nsted-Lowry definition of acids and bases liberates the acid-base concept from its limitation to aqueous solutions, as well as the requirement that bases contain the hydroxyl group. A BrÃ¸nsted-Lowry acid is a hydrogen-containing species which is capable of acting as a proton (hydrogen ion) donor.

Taste a bit of lemon juice or vinegar. Now taste a tiny fleck of baking soda. Lemon juice and vinegar are acidic, while baking soda is alkaline, or a base. Almost every liquid is either an acid or a base. Chemists know that acids have a lot of hydrogen ions. Bases have a lot of hydroxide ions. Why does it matter? When you understand acids and bases,you can use them in everyday life. Baking soda makes bubbles when combined with liquid and warmth. These bubbles make cakes, muffins, and cookies rise. Acids can break things down or corrode them. This is why you can use vinegar to clean windows. It breaks down grease and grime. Fun Facts A pH chart describes how acid or alkaline something is. A pH rating of 7 is neutral; 8 to 14 is alkaline; 1 to 6 is acid. Soil can be neutral, acidic, or alkaline. Some plants grow better in alkaline soil. Others need acidic soil. Some bases and acids are very strong and can be dangerous. A substance with many hydrogen ions, such as vinegar, orange juice, and stomach acid. A substance with many hydroxide ions, such as baking soda, bleach, or soapy water. NeoK12 offers videos explaining the pH scale. Q and A Question: Are foods acidic or alkaline? Depends on the food. Most fruits, including tomatoes, are acidic. Vegetables are slightly acidic to neutral. Dairy products and meats are usually slightly acidic or neutral. How do I know if something is acidic or alkaline? Acids usually taste sour; alkaline foods taste bitter. Bases turn litmus paper blue while acids turn litmus paper red or pink.

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Chapter 3 : Kids science: Acids and Bases

Chem 1B 1Dr. White Worksheet 5: Acids and Bases 1. a) Define acid and base using the Arrhenius definition. b) Define acid and base using the Bronsted-Lowry definition.

Almost all liquids are either acids or bases to some degree. Whether a liquid is an acid or base depends on the type of ions in it. If it has a lot of hydrogen ions, then it is an acid. If it has a lot of hydroxide ions, then it is a base. From 0 to 7 are acids, with 0 being the strongest. From 7 to 14 are bases with 14 being the strongest base. This would be something like distilled water. Strong Acids and Bases Acids with a low pH of around 1 are very reactive and can be dangerous. The same is true for bases of a pH near Chemists use strong acids and bases to get chemical reactions in the lab. Although they can be dangerous, these strong chemicals can also be helpful to us. They can be very dangerous and can burn your skin. Acids and Bases in Nature There are many strong acids and bases in nature. Some of them are dangerous and used as poisons by insects and animals. Many plants have acids and bases in their leaves, seeds, or even their sap. Citrus fruits like lemons and oranges have citric acid in their juice. This is what makes lemons taste so sour. Acids and Bases in our Bodies Our bodies use acids and bases too. Our stomachs use hydrochloric acid to help digest foods. This strong acid also kills bacteria and helps to keep us from getting sick. Our muscles produce lactic acid when we exercise. Also, our pancreas uses a base called an alkali to help with digestion. These are just a few examples of how the chemistry of bases and acids help our bodies function. Other Uses Science and technology makes good use of acids and bases. Car batteries use a strong acid called sulphuric acid. Chemical reactions between the acid and lead plates in the battery help make electricity to start the car. They are also used in many household cleaning products, baking soda, and to make fertilizer for crops. Fun Facts Acids and bases can help neutralize each other. Acids turn litmus paper red, bases turn it blue. Strong bases can be slippery and slimy feeling. Acids taste sour, bases taste bitter. Proteins are made up of amino acids. Vitamin C is also an acid called ascorbic acid. Ammonia is a base chemical. Activities Take a ten question quiz about this page.

Chapter 4 : How to Explain Acids and Bases to Kids: 10 Steps (with Pictures)

About This Quiz & Worksheet. The Bronsted-Lowry and Lewis definitions of acids and bases both build on the work of Svante Arrhenius, and this quiz and worksheet combination will help you test your.

Chapter 5 : Acids and Bases Questions for Tests and Worksheets

Acids/Bases & pH Worksheet (continued) Complete the following table by filling in the empty spaces. Indicate if the solution is acidic, basic or neutral.

Chapter 6 : pH Scale: Acids, bases, pH and buffers (article) | Khan Academy

bronsted - lowry acids & bases worksheet According to Bronsted-Lowry theory, an acid is a proton (H +1) donor, and a base is a proton acceptor. Label the Bronsted-Lowry acids (A), bases (B), conjugate acids (CA), and conjugate bases (CB) in the.

Chapter 7 : Acids and bases | Chemistry | Science | Khan Academy

Worksheet 20 - Acids and Bases The BrÃ¸nsted-Lowry definition of an acid is a substance capable of donating a proton (H+), and a base is a substance capable of accepting a proton.

Chapter 8 : Seventh Grade (Grade 7) Acids and Bases Questions for Tests and Worksheets

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