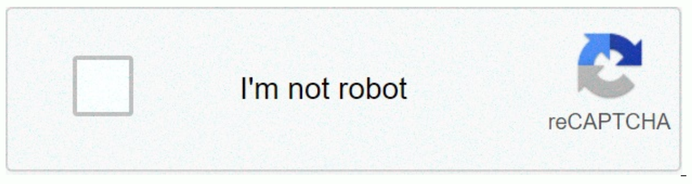

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Energy unit conversions worksheet

BTU, calorie (cal), electronvolt (eV), erg, foot-pound, gigajoule (GJ), joule (J), kilocalorie (kcal), kilojoule (kJ), kilowatt hour (kWh), megajoule (MJ), nutritional calories (Cal), ton of TNT (tn), watt hour (Wh) Thanks for being interesting in our services. We are a non-profit group that runs this website to share documents. We need your help with the maintenance of this site. To keep our site running, we need your help to cover the cost of our server (about $400/m), a small donation will help us a lot. Please help us share our service with your friends. In order to continue to enjoy our site, we ask you to confirm your identity as a human being. Thank you very much for your cooperation. The IS unit for energy is the joule(1). The joule received the symbol J(2) The most common conversion of the energy unit is between joules (J) and kilojoules (kJ): There are 1000 J in 1 kJ so 1000 J - 1 kJ How to convert the initial unit into the initial final unit joules final unit unit (J) ÷ 1000 kilojoules (kJ) kilojoules (kJ) × 1000 joules (J) Calorie(3) is a non-SI unit for measuring energy. 1 calorie ≈ 4.18 joules(5) 1 cal ≈ 4.18 J How to convert the initial unit into the initial final unit conversion final unit calories (cal) × 4.18 joules (J) joules (J) ÷ 4.18 - calories (cal) Please do not block ads on this site. No ads - no money for us - no free stuff for you! If and metric units of energy Unit if energy is joule (J). 1 J is actually a fairly small amount of energy. We only need 4.18 J of energy to increase the temperature of 1 gram of liquid water by 1 'C(6) If you want to boil 500 g of water to make a cup of tea, you will need 500 × 4.18 - 2090 J of energy just to increase its tempertaure by 1oC. If the temperature of the water you put in the kettle is 25 degrees Celsius, you need to raise the temperature by 75 degrees Celsius to bring it to the boiling point of the water to 100 degrees Celsius.(7) The amount of energy required to do so by 75 × 2090 J - 156,750 J The energy involved in most of the chemical reactions you will encounter in your chemistry class is in the order of thousands of joules of energy per gram of reaction. The prefix kilo is used to designate a multiplication by 1000 This means that 1 kilojoule - 1000 × 1 joules - 1000 joules The prefix kilo is given the symbol k, so 1 kilojoule - 1 kJ 1000 J - 1 kJ If divide the two sides of this equation by 1000, we can find out how many kilojoules are in 1 J: 1000 J ÷ 1000 -1 kJ ÷ 1000 1 J - 0.001 kJ - 1 × 10-3 kJ So if it takes 156 750 J of energy to raise the water temperature in maillo kettle its boiling point is equivalent to: 156,750 × 1 J - 156,750 × 10-3 kJ - 156.75 kJ Chemists commonly use kilojoules (kJ) as a unit of measurement when talking about the energy involved in chemical reactions in the laboratory. But, if you use chemical reactions like burning coal, or nuclear fission reactions, nuclear, produce electricity in a power plant, you have to use a much, much, much larger unit of energy like megajoules (MJ) or gigajoules (GJ) to express the total amount of energy produced. 1 megajoule is 1 million joules: 1 MJ - 1,000,000 J - 106 J 1 gigajoule is 1 billion joules: 1 GJ - 1,000,000,000 J - 109 J The table below lists the common metric prefixes, symbols, and their multiplication factor given in scientific notation: larger → → → → → → → → → → smaller factors 1012 109 106 103 102 101 10-1 10-2 10-3 10-6 10-9 10-12 10-15 10-18 prex t giga mega kilo hecto deca deci centi milli micro pico femto symbol T G M k h da d c m µ n p f a Using this table, we find that: 1 kilojoule (1 kJ) - 103 joules (1000 J) 1 joule (1 J) - 1 ÷ 103 kilojoules - 0.001 kJ 1 millijoule (1 mJ) - 10-3 joules (0.0 1 joule (1 J) - 1 ÷ 10-3 millijoules - 1000 mJ 1 microjoule (1 J) - 10 -6 joules (0.000001 J) 1 joule (1 J) - 1 ÷ 10-6 microjoules - 106 J Do you know that? Join AUS-e-TUTE! Play the game now! The most likely conversions you will need to perform during your chemistry course will be between joules (J) and kilojoules (kJ) To convert kilojoules (kJ) into joules (J): multiply the number of kilojoules (kJ) by 1000 to give an energy value in joule units (J) Energy (J) - energy (kJ) × 1000 To convert joules (J) into kilojoules (kJ): divide the number of joules (J) by 1000 to give an energy value in kilojoules (kJ) energy (kJ) - energy (J) ÷ 1000 Do you understand that? Join AUS-e-TUTE! Take the test now! Worked examples of converting joules into kilojoules, and, Kilojoules to Joules Question 1: Convert 1 kilojoule into joules Solution: From the table above, we see that kilo - 103 - 1000 1 kJ - 103 J - 1000 J 1 kilojoule - 1,000,000 joules Question 2: Convert 2,,5 kJ in Joules Solution: From the table above, we see that kilo - 103 - 1000 1 kJ - 1000 J Multiply both sides of the equation by 2.5 : 2.5 × 1 kJ - 2.5 × 1,000 J 2.5 kJ - 2,500 J That we can express in scientific notation such as: 2,500 J - 2.5 × 103 J Question 3: Convert 5 millijoules into a solution: From the table above, we see that milli 10-3 1 mJ - 10-3 J Multiply both sides of the equation by 5: 5 × 1 mJ - 5 × 10-3 J - 0.005 J 5 mJ - 0.005 J Question 4 : Convert 250 J into kilojoules Solution: From the table above, we see that: 103 J - 1 kJ Divide

the two sides of the equation by 1000 to find the number of kilojoules in 1 joule: 103 J ÷ 103 - 1 kJ ÷ 10 3 1 J - 10 -3 kJ - 0.001 kJ Multiply both sides of the equation by 250: 250 × 1 J - 250 × 0.001 kJ 250 J - 0.250 kJ Question 5 In: Convert 25 J into kilojoules Solution: From above, we see tha µ 10-6 1 -J - 10-6 J Multiply both sides of this equation by 25 to determine the number of joules in 25 J: 25 × 1 J 25 × 10-6 J 25 -J - 2.5 × 10-5 J Convert 2.5 × 10-5 J in kilojoules: From the table above see that: 1 kJ - 103 J Divide the two sides of this equation by 103: 1 kJ ÷ 103 - 1 J ÷ 103 10-3 kJ - 1 J Multiply both sides of the equation by 2.5 × 10-5 to find the number of kJ in 2.5 × 10-5 J (2.5 × 10-5) × 10-3 kJ -(2.5 × 10-5) × 1 J 2.5 × 10-8 kJ - 2.5 × 10-5 J State the answer to the question : 25 J - 2.5 × 10-8 kJ Quick Question Question 1. Converting 0.343 kJ into J A calories is a non-metric energy unit. It is a greater measure of energy than unity if energy, joule. 1 calorie ≈ 4.18 joules 1 kilocalorie ≈ 4.18 kilojoules 1 kilocalorie ≈ 1000 × 2 4.18 joules - 4180 joules 1 joule ≈ 1 calorie ÷ 4.18 - 0.239 calories 1 kilojoule ≈ 1 kilocalorie ÷ 4.18 - 0.239 kilocalories 1 kilojoule ≈ 1000 × 0.239 calories - 239 calories The most likley conversions you will need to make are between joules (J) and calories (cal) To convert energy into energy (cal) into joules (J) : multiply the energy in calories (cal) by 4.18 to give an energy value in joules (J) energy (J) - 4.18 × energy (cal) To convert energy into joules (J) energy in calories (cal): divide energy into joules (J) by 4.18 to give an energy value in calories (cal) energy (cal) - energy (J) ÷ 4.18 Alternative method to convert energy into joules (J) into energy in calories (cal) multiply energy in joules (J) by 0.239 (since 1 ÷ 4.18 - 0.239) to give energy in calories (cal) energy (cal) - energy (J) × 0.239 Can you apply this? Join AUS-e-TUTE! Take the exam now! Question 1: Convert 100 calories into joules Solution: 1 calorie - 4.18 joules multiply both sides of the equation by 100: 100 × 1 calorie - 100 × 4.18 J 100 cal - 418 J Question 2: Convert 12.0 kiloorriescal to kilojoules Solution: 1 kilocalorie - 4.18 kilojoules multiply both sides of the equation by 12.0 12.0 × 1 kilocalorie - 12.0 × 4.18 kJ 12.0 kcal - 50.2 kJ Question 3 : Convert 150 kilocalories into joules Solution: Calculate the number of kilojoules in 150 kilocalories: 1 kilocalorie - 4.18 kilojoules multiply both sides of the equation by 150,150 × 1 kilocalorie - 150 × 4.18 kJ 150 kcal - 627 kJ Calculate the number of joules in 622 kJ 1 kilojoule - 1000 joules multiply both sides of the equation by 622,627 × 1 kJ - 627 × 1000 J 627 kJ - 627,000 J Write the answer to the question : 150 kcal - 627,000 J Question 4: Convert 10 joules into calories Solution: 1 joule - 0.239 calories multiply both sides of the equation by 10 10 × 1 J - 10 × 0.239 cal 10 J - 2.39 cal Question 5 : Convert 1.2 kilojoules into kilocalories Solution: 1 kilojoule - 0.239 kilocalories multiply both sides of the equation by 1.2 1.2 × 1 kJ - 1.2 × 0.239 kcal 1.2 kJ - 0.287 kcal Question 6 : Convert 1500 joules into kilocalories Solution: Calculate the number of calories in 1500 joules 1 0.239 calories multiply both sides of the equation by 1500 1500 × 1 J - 1500 × 0.239 cal 1500 J - 359 calories Calculate Calculate number of kilocalories in 539 calories 1000 calories - 1 kilocalorie Divide the two sides of the equation by 1000 1000 calories ÷ 1000 - 1 kilocalorie ÷ 1000 1 calorie - 0.001 kilocal multiply both sides of the equation by 539,359 × 1 calorie - 359 × 0.001 kilocalories 359 calories - 0.359 kilocalories Write your answer to the question: 1500 J - 0.359 kcal Quick Question Question 1. Converting 12.5 J to cal (1) The Ninth International Conference on Weights and Measures (1948) recommended the use of joule (volt coulomb) as a heat unit. The joule is an IS unit derived for the measurement of energy. The BASIC SI unit for energy measurement is kg.m2 s-2 1 J - 1 kg.m2 s-2 (2) The joule is named after the English physicist James Prescott Joule. (3) The calorie, from the Latin calor meaning heat, was first defined by Nicolas Clément in 1824 as a unit of heat. (4) Other energy measurement units are: erg (1 J - 107 ergs) British Thermal Units, BTU (1 J - 9.48 × 10-4 BTU) electronvolts, eV (1 J - 6.24 × 1018 eV) kilowatt hours, kWh (1 J - 2.78 × 10-7 kWh) (5) National Bureau of Standards set a calorie equal to exactly 4,1840 J You'll find this approximate to 1 cal - 4.18 J, even 1 cal - 4.2 J , when used in schools. Note that this will have an effect on the number of significant numbers you will be able to use in your calculations. (6) The calorie, another unit of energy was defined as the amount of energy needed to increase the temperature from 1 gram of liquid water to 1 atmospheric pressure from 1 'C. 1 calorie ' 4.18 joules It takes 4.18 joules of energy to increase the temperature from 1 gram of liquid water to 1 atmospheric pressure of 1 'C. For more information on this, go to the thermal capacity tutorial. (7) This is only the amount of energy needed to raise the temperature to 100 degrees Celsius. If you want to boil the water you need to provide even more energy, but that energy will be used to break the intermolecular forces between the water molecules in the liquid, the energy will not be used to raise the water temperature further. Go to the Latent Heat tutorial to learn more. More.