



CHEMICAL BONDS



IONIC, COVALENT, & METALLIC

FORMS OF CHEMICAL BONDS
Bonding: combination of atoms

Atoms combine to form molecules by sharing or transferring electrons. This process is called bonding. The resulting molecule has a different chemical and physical properties than the individual atoms.

Types of Bonds:

- Covalent Bond:** Atoms share electrons to form a bond. Example: H_2 , H_2O , CO_2 .
- Ionic Bond:** One atom transfers electrons to another atom. Example: $NaCl$, MgO .
- Metallic Bond:** Atoms in a metal share their valence electrons in a "sea of electrons". Example: Fe , Cu , Al .

Covalent, Ionic, and Metallic Bonds

Covalent bonds are formed by sharing electrons between two non-metal atoms. Ionic bonds are formed by the transfer of electrons from a metal atom to a non-metal atom. Metallic bonds are formed by the sharing of valence electrons among many metal atoms.

Science Real

IONIC BONDING

Atoms transfer electrons to form ions. Oppositely charged ions attract each other, forming an ionic bond. Example: $NaCl$.

COVALENT BONDING

Atoms share electrons to form a covalent bond. Example: H_2O , CO_2 .

METALLIC BONDING

Atoms in a metal share their valence electrons in a "sea of electrons". Example: Fe , Cu , Al .

Diagram of Ionic Bonding: Shows a sodium atom (Na) losing an electron to become a sodium ion (Na^+) and a chlorine atom (Cl) gaining an electron to become a chloride ion (Cl^-). The resulting $NaCl$ molecule is shown with the ions held together by an ionic bond.

Diagram of Covalent Bonding: Shows two hydrogen atoms (H) sharing their valence electrons to form a covalent bond, resulting in a hydrogen molecule (H_2).

Diagram of Metallic Bonding: Shows a cluster of metal atoms with their valence electrons delocalized in a "sea of electrons" surrounding the atoms.

Diagram of Bond Types: Shows the relative strength of ionic, covalent, and metallic bonds. Ionic bonds are the strongest, followed by covalent bonds, and then metallic bonds.

GUIDED READING ACTIVITY

Covalent Bonds Reading Notetaking Guide

**Kenneth Malcolm Mackay, Rosemary
Ann Mackay**



Covalent Bonds Reading Notetaking Guide:

Reading and Writing in Science Maria C. Grant, Douglas Fisher, 2010 Written by a science educator and a literacy expert this resource gives secondary science teachers an approach for developing students disciplinary literacy so they can access science content

Reader's Guide to the History of Science Arne Hessenbruch, 2013-12-16 The Reader's Guide to the History of Science looks at the literature of science in some 550 entries on individuals Einstein institutions and disciplines Mathematics general themes Romantic Science and central concepts Paradigm and Fact The history of science is construed widely to include the history of medicine and technology as is reflected in the range of disciplines from which the international team of 200 contributors are drawn

Focus on Physical Science California Edition Michael J. Padilla, 2007

Chemical Interactions, 2005

Reader's Guide to Periodical Literature Supplement, 1954

Instructor's Guide for Campbell's Biology Nina Caris, Harold T. Underwood, 1996

Drexel Polymer Notes, 1990

Manual of the Public Examinations Board University of Adelaide. Public Examinations Board, 1967 The Manuals include information on syllabus regulations copies of examination papers and notes by examiners They also include pass lists

Student Self-study Guide Donald W. Shive, 1975

Films and Other Materials for Projection Library of

Congress, 1963

Library of Congress Catalog: Motion Pictures and Filmstrips

Library of Congress, 1963 A cumulative list of works represented by Library of Congress printed cards

Readers' Guide to Periodical Literature Anna Lorraine

Guthrie, Bertha Tannehill, Neltje Marie Tannehill Shimer, 1988 An author subject index to selected general interest periodicals of reference value in libraries

Teacher's Manual and Resource Guide for Exploring the Sciences Herbert Drapkin, 1964

Introduction to Modern Inorganic Chemistry Kenneth Malcolm Mackay, Rosemary Ann Mackay, 1981 The electronic structure and the properties of atoms Covalent molecules diatomics Polyatomic covalent molecules The solid state Solution chemistry Experimental methods General properties of the elements in relation to the periodic table Hydrogen The s elements The scandium group and the lanthanides The actinide elements The transition metals general properties and complexes The transition elements of the first series The elements of the second and third transition series Transition metals selected topics The elements of the p block

Holt Chemistry Ralph Thomas Myers, 2004

Science Model Curriculum Guide, Kindergarten Through Grade Eight California. State Department of Education, 1987 This guide was developed with the intention of helping teachers and school site administrators in California review the elementary science curriculum and compare it to an idealized model that is presented in the document Part I of the guide provides a summary of a number of characteristics considered to be important to a strong elementary science program It was designed to aid teachers principals and parents in identifying features of their local science program where attention is needed Part II presents a full scale portrait of an elementary science program that focuses on the development of student understanding This section presents teaching ideas that are concerned with both the knowledge base and science process skills Common themes are present in

the discussion of science instruction in the various subject areas The disciplines and associated themes addressed are 1 biological science cells genetics evolution plants protists animals human beings ecosystems 2 earth science astronomy geology and natural resources meteorology oceanography and hydrology and 3 physical science matter mechanics energy sources and transformation heat light electricity magnetism and sound TW *Modules* McDougal Littell Incorporated,2005

The Macmillan Guide to Correspondence Study Modoc Press,1996 *How to Study Science* Fred Drewes,2000 This text aims to help students get the most out of their science course by giving them suggestions on notetaking managing study time and taking tests A multidisciplinary approach is taken including examples from biology chemistry physics geology and meteorology *Paperbound Book Guide for Colleges* ,1970

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