

## Chemistry

### ACIDS, BASES, AND SALTS

22 min; color; h

1/2" VHS **FC0425,VH**

Introduces acids, bases, and salts and explains their relationship on the basis of the Arrhenius Ionization Theory, the Bronsted-Lowry Theory, and the Lewis Theory. Shows the properties of acids in aqueous solutions; various laboratory methods of preparing acids; properties of bases, their use, and methods of preparation; and properties of salts and methods of preparation. The equations for all reactions are superimposed on the screen. Summarizes the primary use of acids, bases, and salts. (CORT;c1959)

Acids

### APPLICATIONS OF AN ELECTROCHEMICAL CELL

20 min; color; c,a

1/2" VHS **FC1544,VH**

Experiment: Chemistry Series - Shows a series of experiments using an electrochemical cell to measure the concentration of silver ions in solution during titration to examine the equilibrium relationships between ions, precipitates and complexes. Uses a similar experiment with ammonia as the titrant to enable students to extend the analysis of the equilibrium constant to include the stoichiometry of complexes in solution as the silver (I)-amine is formed. (FFHS;c1986)

Chemistry; Electrochemistry

### THE ASCENT OF MAN: A PERSONAL VIEW BY J. BRONOWSKI SERIES

Dr. Jacob Bronowski charts humanity's progress from the vantage point of the scientist/philosopher.

#### THE ASCENT OF MAN: A PERSONAL VIEW BY J. BRONOWSKI, NO. 4: THE HIDDEN STRUCTURE

55 min; color; h,c,a

1/2" VHS **CA1324,VH**

Looks at the influence and importance of fire, explaining that it was once thought of as an element, but is actually a process of transformation. Shows the history of its uses from the time smelting was first practiced, including filming of the ritual ceremony of making Samurai swords. Covers the work of Paracelsus, Priestly, and John Dalton, to illustrate the essence of science: ask an impertinent question and you are on the way to a pertinent answer. (TIMELIF; p1975)

Chemistry; Science-History; Scientists; World history

### BOILING POINT AND PRESSURE

12 min; color; j,s

1/2" VHS **FC1675,VH**

Physical Science & You Series - Demonstrates that liquids boil when atmospheric pressure is equal to vapor pressure. The lower the atmospheric pressure, the lower the boiling point. The principle is demonstrated at an oil refinery. (PHOENIX;c1986)

Chemistry, Physical

### BOMB CALORIMETRY

20 min; color; c,a

1/2" VHS **FC1545,VH**

Experiment: Chemistry Series - Demonstrates one of the most common thermodynamic measurements—the determination of the heat of combustion of a compound. Uses experiments that measure the values of a series of primary straight chain alcohols to show that a standard grouping of atoms, such as the CH<sub>2</sub> group, may have a fixed heat of combustion but that extending this concept to an unsaturated ring system can have surprising results. Illustrates that trends in the measured value of the heat of combustion can be related to the exact chemical structure of the compounds. (FFHS;c1986)

Chemistry

### BOYLE'S LAW

12 min; color; j,s

1/2" VHS **FC1676,VH**

Physical Science & You Series - Discusses Boyle's law, which states "With a constant temperature, the volume of a fixed amount of gas is inversely related to the absolute pressure." The law is demonstrated by a scuba diver and by a car owner inflating his tires with air. (PHOENIX; c1986)

Chemistry, Physical

### CARBON DIOXIDE CHEMICAL REACTION RATES

16 min; color; h,c

1/2" VHS **FC1827,VH**

School Chemical Experiments Series - Illustrates several chemical experiments for the benefit of a school science curriculum limited in time and resources. Demonstrates chemical reactions through clearly labeled and visible steps performed by experts. Examines some of the uses of carbon dioxide and the formation of calcium carbonate. Identifies some of the effects of such factors as temperature and concentration. (LAEM;c2001)

Chemistry, Organic

### CELLS AND MOLECULES

11 min; color; c,a

1/2" VHS **NC2294,VH**

Visualizing Cell Processes Series - Uses videomicrography to illustrate the dynamic cell processes that occur at the molecular and sub-microscopic levels. Covers a variety of cells: prokaryotes, flagellates, amoebas, and ciliates. Explains the endosymbiotic theory and cell organization, and provides an overview of organic molecules. (BIOMA;INSIGHM;c1995)

Biochemistry; Cells

### CELLULAR RESPIRATION SERIES

GLYCOLYSIS 1 [NC2290]

GLYCOLYSIS 2 [NC2308]

THE KREBS CYCLE [NC2288]

### CHEMICAL SAFETY IN THE LABORATORY

34 min; color; c,a

1/2" VHS **LC0285,VH**

Provides employees with a better understanding of potentially hazardous chemicals in the laboratory, explaining why they are hazardous and what safety practices must be followed when using them. (MARCOMG;AIMS;c1990)

Laboratories-Safety measures

### CHEMISTRY SERIES

#### CHEMISTRY: ACIDS, BASES AND SALTS (SECOND EDITION)

19 min; color; j,h,c

1/2" VHS **FC1523,VH**

Explores the properties of acids, bases, and salts—three related groups of compounds of unusual chemical significance. Explains that acids and bases can be defined by their behavior with indicators and by their contribution of hydrogen or hydroxide ions to solutions. Looks at the Bronsted-Lowry theory which defines acids as proton donors and bases as proton acceptors. Touches on the Lewis theory, the meaning of pH, the role of buffers, and gauges reactions between acids and bases that produce energy changes, neutralization, and salts. (CORT;r1983)

Chemistry

## Chemistry

### CHEMISTRY: CHEMICAL BONDING AND ATOMIC STRUCTURE (SECOND EDITION)

23 min; color; j,h,c

1/2" VHS **FC1524,VH**

Investigates the properties of metallic, ionic, and covalent bonds. Demonstrates that the physical and chemical properties of elements and compounds depend to a large extent on the nature of these bonds. Explores the world of interatomic bonds and forces dealing with ions, atoms, valence, and polarity, and van der Waals forces. (CORT;r1983)

Chemistry, Physical

### CHEMISTRY: ELEMENTS, COMPOUNDS AND MIXTURES (SECOND EDITION)

20 min; color; j,h,c

1/2" VHS **FC1525,VH**

Illustrates the basic types of materials in our world: pure substances (elements and compounds) and homogeneous and heterogeneous mixtures. Examines a tiny raindrop and then expands the laboratory to the sea, from life processes to industrial processes, to show how compounds and mixtures can be separated into parts. Explains how compounds can be separated into elements and how the molecules and atoms that make up elements and compounds give them their unique characteristics. (CORT;r1983)

Chemistry

### CHEMISTRY: REACTION RATES AND EQUILIBRIUM

21 min; color; j,h,c

1/2" VHS **FC1527,VH**

Demonstrates that certain factors influence the rates at which chemical reactions happen, including the strength of the bonds that form a substance, concentration, and temperature. Explains concentration and temperature influences in terms of the Collision Theory, which involves activated complexes. Explores how equilibrium can be upset, and discusses its role in the chemical industry. (CORT;r1983)

Chemical reaction

### CHEMISTRY: SOLUTIONS (IONIC AND MOLECULAR) (SECOND EDITION)

22 min; color; j,h,c

1/2" VHS **FC1522,VH**

Defines the chemical nature of a solution and illustrates the role of electrostatic forces. Shows differences between a suspension, a colloid (Tyndall effect) and a true solution (Brownian motion). Examines saturation, and presents the concept of polarity to explain why some substances, such as oil, are insoluble. (CORT;r1983)

Solution (Chemistry)

### CHEMISTRY: THE PERIODIC TABLE AND PERIODICITY

24 min; color; j,h,c

1/2" VHS **FC1526,VH**

Examines the development and structure of the periodic table, explaining that each chemical element has its own unique physical and chemical properties and that the pattern of these properties led to the development of the periodic table—a way of organizing these patterns. Uses animation to analyze the relationship between the electronic structure of an atom and its properties, showing clearly why there are families of elements and gradual changes in the properties of elements arranged by atomic number across the table. (CORT;r1983)

Chemistry

### CONFUSION IN A JAR

58 min; color; h,c,a

1/2" VHS **FC1691,VH**

Nova Series - Highlights the cold fusion controversy, explores the implications of fusion as a source of energy, and shows why the reproducibility of scientific results is so important to any major discovery. Follows the attempts of scientists to independently verify the experiments conducted by Stanley Pons at the University of Utah and Marvin Fleischmann at England's University of Southampton, demonstrating nuclear fusion at room temperature. Explains that Pons and Fleischmann's claims have been largely discredited because of the lack of formal documentation. *Closed Captioned.* (WGBHTV; CORT;c1991)

Electrochemistry; Ethics; Nuclear physics; Science—Methodology; Philosophy (CPI)

### DIFFUSION AND PHASE CHANGES OF MATTER

11 min; color; h,c

1/2" VHS **FC1689,VH**

Explains that two major factors affect the rate of diffusion: heat and the distance between molecules. An experiment with water and syrup shows why heat increases the movement of molecules and accelerates diffusion. The particle model is used to diagram the molecular patterns of gases, liquids, and solids. (AIMS;c1991)

Chemistry; Matter; Physics

### DRUM BEAT FOR MOTHER EARTH: HOW PERSISTENT ORGANIC POLLUTANTS THREATEN THE NATURAL ENVIRONMENT AND THE FUTURE OF INDIGENOUS PEOPLES

55 min; color; c,a

1/2" VHS **NC2347,VH**

Documents how chemical pollutants end up in our food chain, and emphasizes how the physical and spiritual health of indigenous peoples is especially threatened by reliance on animal life that is now more polluted. Defines persistent organic pollutants (POPs) and shows how they work their way into our food chain and environment. Interviews several Native Americans in the U.S., Mexico, and Guatemala about the negative effect of POPs in their lives. Argues that changing indigenous ways of life is not an option; instead, change should come from the manufacturers of industrial chemicals. (GREEINE; BULFROG;c1999)

Chemistry, Organic; Ecology; Environmental protection; Indians of Mexico; Indians of North America; Indians of South America

### ECOLOGY: NUTRIENT CYCLES

14 min; color; j,h,a

1/2" VHS **NC2132,VH**

Essential elements move in nutrient cycles, from the environment into the bodies of a succession of living things, then back to the environment. On a mountain plateau, algae and bacteria fix nitrogen, which is then absorbed by plants. Herbivores eat the plants, and carnivores eat the herbivores, recycling nitrogen atoms. Finally, bacteria return these atoms to the atmosphere. In a rain forest, plants absorb carbon through photosynthesis. These atoms also move through a nutrient cycle, returning to the atmosphere as a by-product of cell respiration. In a mangrove swamp, oxygen passes through a nutrient cycle, assisted by plants whose roots have adapted to oxygen-poor mud. In the ocean, phosphorus is scarce, and tends to settle in bottom sediment, where it may be locked up for millions of years. Eventually, it will be released by geologic activity and re-enter a nutrient cycle. (CORT;c1992)

Chemistry; Ecology

**ELEMENTS ORGANISED—THE PERIODIC TABLE**

24 min; color; c,a

1/2" VHS **FC1517,VH**

Discusses and demonstrates those qualities and behaviors of elements that led to their arrangement in the periodic table. Uses demonstrations of chemical experiments plus animation, archival films, and special effects to show the trends across periods. Concludes with the new arrangement of the element table in terms of metals, explaining the irregularities which led to this new formulation and what was required of it in terms of structure and organization. (OPENUN;MEDG;c1978)

Chemistry

**EMPIRICAL FORMULA BY MICROANALYSIS**

20 min; color; c,a

1/2" VHS **FC1546,VH**

Experiment: Chemistry Series - Illustrates two experiments conducted to determine the empirical formula of an unknown compound containing only carbon, nitrogen, hydrogen, and oxygen. Moves slowly step-by-step through the procedure allowing the student to record the necessary measurements for determining the unknown organic compound. Shows in the first experiment how carbon and hydrogen are determined simultaneously by burning a sample of the substance in a fast stream of pure oxygen. Explains in the second experiment a technique that involves a series of reactions to convert the nitrogen in a sample of known weight to ammonia gas which is absorbed in boric acid and quantitatively titrated with HCl. (FFHS;c1986)

Chemical reaction; Chemistry

**EVOLUTION: MAN TAKES A HAND**

26 min; color; h,c,a

1/2" VHS **NC2106,VH**

Life Revolution Series - Explains that the consequences of gene splicing are unforeseeable and describes the scientific and governmental regulations under consideration; describes the sequencing of DNA and how the information gained from reading these sequences, and explains that cells activate only certain genes at certain times. Follows the scientific and economic history of interferon and Interleukin-2. (HARJONA;FFHS;c1990)

Biochemistry; Biotechnology; Evolution; Genetics

**EXPERIMENT: CHEMISTRY SERIES***For descriptions see individual titles:*

APPLICATIONS OF AN ELECTROCHEMICAL

CELL [FC1544]

BOMB CALORIMETRY [FC1545]

EMPIRICAL FORMULA BY MICROANALYSIS

[FC1546]

A KINETIC STUDY USING

SPECTROPHOTOMETRY [FC1547]

MAGNETOCHEMISTRY [FC1548]

MASS SPECTROMETRY [FC1549]

MECHANISM OF ALKENE BROMINATION [FC1550]

MOLAR MASS BY ELEVATION OF BOILING

POINT [FC1551]

A STUDY OF ESTERIFICATION [FC1552]

THERMOMETRIC TITRATIONS [FC1553]

**FOOLING WITH NATURE**

60 min; color; c,a

1/2" VHS **NC2357,VH**

Frontline Series - Examines new evidence in the controversy over the danger of man-made chemicals to human health and the environment, 35 years after Rachel Carson first raised concerns of an impending ecological crisis. Looks at the inside world of scientists, politicians, activists, and business officials embroiled in the debate. (HAMILDO;PBSV;c1998)

Chemistry; Environmental protection; Pollution

**FOR ALL PRACTICAL PURPOSES:  
INTRODUCTION TO CONTEMPORARY  
MATHEMATICS SERIES**

Each program incorporates innovative techniques, such as computer-generated graphics, to present the dynamics of mathematical processes, enabling viewers to see quantities and dimensions progressively changing through time. *For descriptions see individual titles.*

ON SIZE AND SHAPE (2)—HOW BIG IS TOO

BIG: SCALE AND FORM [IC0861]

**FRONTLINE SERIES**

Probes into the heart of the issues behind the headlines, investigating a wide variety of topics from international affairs to domestic news and current trends. Produced by the Documentary Consortium of public television stations (KCTS Seattle, WGBH Boston, WNET New York, WPBT Miami, WTVS Detroit). *For descriptions see individual titles:*

FOOLING WITH NATURE [NC2357]

**GAS DIFFUSION RATES**

12 min; color; j,s

1/2" VHS **FC1680,VH**

Physical Science & You Series - Demonstrates the principle that states "the rate at which a gas diffuses depends on the size of the molecules of the gas." Cites fire as an example of gas diffusion rates, describing the physical characteristics of fire as firemen battle a blaze. (PHOENIX;c1986)

Chemistry; Gases

**THE GENETIC CODE**

11 min; color; c,a

1/2" VHS **NC2298,VH**

Visualizing Cell Processes Series - Uses videomicrography to illustrate cell processes that occur at the molecular and sub-microscopic levels. Includes discussion of the protein nature of life; protein structure; transcription, translation and protein synthesis; gene regulation in prokaryotes; classes of eukaryote DNA; exons and introns; and mutations. (BIOMA;INSIGHM;c1994)

Biochemistry; Cells; Genetics

**GENETIC ENGINEERING AND PROTEIN  
SYNTHESIS**

27 min; color; h,c

1/2" VHS **NC1969,VH**

Modern Biology Series - Uses animation and live photography to explain protein synthesis. Explains "gene splicing" and illustrates how plasmids can have a DNA fragment removed and replaced with a donor DNA fragment or gene, producing valuable substances such as insulin and interferon. Takes a step-by-step approach to illustrate three ways of obtaining donor genes or DNA fragments to insert into plasmids. (BENM;c1987)

Genetics; Protein biosynthesis

**GLYCOLYSIS 1**

10 min; color; c,a

1/2" VHS **NC2290,VH**

Cellular Respiration Series - Uses narration and computer animation to explain the first half of glycolysis, the process of cellular respiration in which glucose is transferred to ATP in order to release energy. Follows the sequential breakdown of the glucose molecule through the process of glycolysis and shows how the ATP molecules are produced. *Closed captioned.* (CHAMBDA;FFHS;c1988)

Biochemistry; Cells; Respiration

## Chemistry

### GLYCOLYSIS 2

10 min; color; c,a

1/2" VHS **NC2308,VH**

Cellular Respiration Series - Covers the second half of the glycolysis process, ending with the production of the molecule pyruvate. Also looks at how simple life forms produce alcohol. (CHAMBDA;FFHS;c1988)

Biochemistry; Cells; Digestion

### HEAT OF FUSION

12 min; color; j,s

1/2" VHS **FC1681,VH**

Physical Science & You Series - Demonstrates that the heat of fusion is the energy required to melt one gram of a solid at its melting point. The principle is demonstrated by glass making and by melting ice cream. (PHOENIX;c1986)

Chemistry; Heat; Physics

### HOW TO CREATE A JUNK FOOD

58 min; color; h,c,a

1/2" VHS **HC1437,VH**

Nova Series - Takes a behind-the-scenes look at the extensive research and development and enormous expenditures that go into better tasting, more salable fast foods. Following the progress of two fast food products in the making, explores such techniques as "chew" profiling, scans, synthetic chemistry, and high-tech mass production—all coming before the product's actual name designation and marketing. *Closed Captioned.* (WGBHTV;CORT;c1988)

Biochemistry; Food; Marketing

### INFINITE VOYAGE SERIES

MIRACLES BY DESIGN [CC5096]

### INTRODUCING PHOTOCHEMISTRY

25 min; color; h,c

1/2" VHS **FC1513,VH**

Photochemistry Series - Uses laboratory experiments and animation to provide a basic introduction to photochemistry. Explains the nature of light and the way that light creates chemical reactions through the absorption and release of energy. Describes the process by which light is absorbed and split into component wave lengths. Demonstrates the devices used by photochemists to analyze and measure light. (OPENUN;MEDG;c1981)

Chemistry; Photosynthesis

### A KINETIC STUDY USING SPECTROPHOTOMETRY

20 min; color; c,a

1/2" VHS **FC1547,VH**

Experiment: Chemistry Series - Demonstrates the analysis of kinetic data and the design of kinetic experiments to verify proposed reaction pathways by way of a kinetic study of the reaction between bromate and bromide ions in the presence of hydrogen ions. Shows how to record the absorbance of product bromine molecules in the reaction mixture, measured by a spectrophotometer, as a function of time for four reaction mixtures containing the same amounts of bromate and bromide but different amounts of hydrochloric acid. (FFHS;c1986)

Chemical reaction; Spectrum analysis

### THE KREBS CYCLE

10 min; color; c,a

1/2" VHS **NC2288,VH**

Cellular Respiration Series - Uses narration and computer animation to explain the ten steps occurring in the Krebs Cycle when pyruvate is metabolized inside cells in order to release energy through NADH. Explains how the Krebs Cycle follows glycolysis in the process of cellular respiration and why it is necessary for greater energy release. *Closed captioned.* (CHAMBDA;FFHS;c1988)

Biochemistry; Cells; Respiration

### LAB SAFETY

12 min; color; h,c

1/2" VHS **LC0182,VH**

Outlines safety procedures to follow when accidents occur in a chemistry lab. Divides fires into four types—ordinary combustibles, burning fluids, electrical fires, and combustible metals—and demonstrates appropriate extinguishers for each type. Explains procedures for using a fire blanket and for washing chemicals out of the eyes and off the body. (INUAVC;INUISS;p1974)

Chemistry; Laboratories—Safety measures; Safety education

### LABORATORY SAFETY

13 min; color; h,c

1/2" VHS **LC0240,VH**

Master/Apprentice Series - Lists rules of laboratory safety, including eye protection, handling of chemicals, and personal dress and behavior. Includes emergency procedures in case of spills and fires with enactments. Uses demonstrations and drawings with narration and superimposed sentences to reinforce rules. (CORLU;c1979)

Chemistry; Laboratories—Safety measures

### LIFE REVOLUTION SERIES

Examines the nature of genetic science, which promises to transform the air we breathe, the food we eat, the fuel we burn, the diseases we get, even human beings themselves. The promises and the dangers of genetic engineering and its scientific bases, are looked at. Each program focuses on a particular aspect of this revolutionary field.

EVOLUTION: MAN TAKES A HAND [NC2106]

### LINUS PAULING: CRUSADING SCIENTIST

57 min; color; c,a

1/2" VHS **CC4898,VH**

Biographical documentary traces the unique achievements of Linus Pauling as both scientist and crusader for peace. As the only person to have ever received two unshared Nobel Prizes, he is recognized as one of America's paragons. (RICHTER;n.d.)

Chemists; U.S.—Biography

### MAGNETOCHEMISTRY

20 min; color; c,a

1/2" VHS **FC1548,VH**

Experiment: Chemistry Series - Examines the electron configuration and oxidation state of the metal ion in a compound by measuring the change in weight of a sample of the compound in a magnetic field gradient. Shows how to record the weight changes of a series of hydrated sulfates of five different metals and how to calculate the weight change per mole of compound. Demonstrates how to measure the weight change per mole of six additional compounds and then to compare this change with the predicted oxidation states and electron configurations of the various metals in these compounds. (FFHS;c1986)

Chemistry; Magnetism

### MAKING OF ANCIENT IRON

40 min; color; c

1/2" VHS **CC5074,VH**

Documents a research project in experimental archaeology that attempts to produce large quantities of iron by the same method that was used in Germany around 100 AD. Explains the process of turning iron ore into iron, and demonstrates the mining process, the building of the furnace, and the attempts to run the operation more or less continuously. Filmed at the University of Minnesota in 1991. (CEFANST;UCEMC;c1991)

Archaeology; History, Ancient (4000 B.C.-A.D. 476); Metallurgy; Technology

## Chemistry

### MAN ON THE RIM: THE PEOPLING OF THE PACIFIC SERIES

Portrays the history of the Pacific Rim countries, focusing on the historical and cultural backgrounds of this remarkable migration. Travels around and across the Pacific basin—from Tasmania to Tierra del Fuego, from Siberia to Easter Island—to trace the human and technological evolutions. Points out that the global economic center of power is shifting to the Pacific and the people of the Rim are emerging as a major force in world affairs.

### MAN ON THE RIM: THE PEOPLING OF THE PACIFIC, NO. 6: THE NEW CUTTING EDGE

60 min; color; h,c,a

1/2" VHS **CC4324,VH**

Recent findings reinforce the relatively new concept of a genuine Asian "Bronze Age," thousands of years earlier than had ever been suspected. Thailand, Vietnam, and other sites across Southeast Asia as far as eastern Indonesia reveal an ancient knowledge of metal working. (DEMIMON;LAEM;c1988)

Anthropogeography—Far East; Asia; Metallurgy

### MASS OF AN ATOM

12 min; color; j,s

1/2" VHS **FC1683,VH**

Physical Science & You Series - Introduces some of the early theories relating to the smallest possible division of a substance and gives evidence by numerous examples that atoms have mass. Explains some of the latest principles used in splitting atoms, discussing the effects in terms of energy and other by-products. (PHOENIX; c1986)

Chemistry; Physics

### MASS SPECTROMETRY

20 min; color; c,a

1/2" VHS **FC1549,VH**

Experiment: Chemistry Series - Demonstrates an experiment using a mass spectrometer to investigate two aspects of electron bombardment of gas phase atoms and molecules. Explores how much energy is required to produce ions and examines what happens when this energy is exceeded. (FFHS;c1986)

Chemistry, Analytic; Chemistry, Physical; Spectrum analysis

### MASTER/APPRENTICE SERIES

*For descriptions see individual titles:*

LABORATORY SAFETY [LC0240]

### MECHANICAL UNIVERSE AND BEYOND SERIES

Continues the Mechanical Universe series. Employs an array of visual techniques including: precision closeup photography of experiments, computer animation sequences, and historical reenactments. Based on the Caltech course by Professor David Goodstein.

### MECHANICAL UNIVERSE AND BEYOND, NO. 19: TEMPERATURE AND THE GAS LAW

30 min; color; c,a

1/2" VHS **FC1572,VH**

Depicts new discoveries about the behaviors of gases which make the connection between temperature and heat, and raise the possibility of an absolute scale.

Reflects the ups and downs of scientific research in Boyle's experiments and Charles' investigations.

*Closed Captioned.* (CAIT;FI;c1986)

Gases

### MECHANISM OF ALKENE BROMINATION

20 min; color; c,a

1/2" VHS **FC1550,VH**

Experiment: Chemistry Series - Presents the bromination of propene carried out in the absence and presence of chloride ions so that students can infer likely reaction mechanisms based on product distributions measured in a gas-liquid chromatograph. Demonstrates how students can reason the most likely reaction intermediate and reaction products formed when the intermediate combines with the available bromine molecules and chloride ions. (FFHS;c1986)

Chemistry

### MIRACLES BY DESIGN

58 min; color; h,c,a

1/2" VHS **CC5096,VH**

Infinite Voyage Series - Explains how technological innovations are influencing our lives, especially in the relatively new field of materials science. Dr. Gregory B. Olson contends that dramatic advances in the next century in laboratory-made materials will improve medical science, transportation, architecture, and other important areas of life. Depicts current applications of synthetic materials and shows scientists and engineers at work on new developments. (WQEDTV;INTELLI;c1991)

Chemistry; Engineering; Technology

### MODERN BIOLOGY SERIES

*For descriptions see individual titles:*

GENETIC ENGINEERING AND PROTEIN SYNTHESIS [NC1969]

### MOLAR MASS BY ELEVATION OF BOILING POINT

20 min; color; c,a

1/2" VHS **FC1551,VH**

Experiment: Chemistry Series - Demonstrates an experiment to measure how much the normal boiling point of a solvent is elevated by the addition of a solute, making it possible to determine the molar mass of the unknown sample. Teaches the techniques of linear plotting of data to determine the proportionality constant in the linear relationship between boiling point elevation and solute concentration. (FFHS;c1986)

Chemistry

### MOTION OF A MOLECULE

12 min; color; j,s

1/2" VHS **FC1684,VH**

Physical Science & You Series - Introduces the concept of molecular motion by explaining how a hot air balloon works based on diffusion. Identifies Brownian motion as an example of molecular diffusion. Discusses variables affecting molecular motion in a gas such as heat, pressure and molecular density. Explains molecular bombardment between molecules in a confined space by plotting molecular paths. Demonstrates molecular motion in liquids and solids. Presents common examples of physical and biological systems dependent on molecular motion. (PHOENIX;c1986)

Chemistry; Matter; Molecules; Physics

### NOVA SERIES

*For descriptions see individual titles:*

CONFUSION IN A JAR [FC1691]

HOW TO CREATE A JUNK FOOD [HC1437]

## Chemistry

### ON SIZE AND SHAPE (2)--HOW BIG IS TOO BIG: SCALE AND FORM

30 min; color; c,a  
1/2" VHS **IC0861,VH**

For All Practical Purposes: Introduction to Contemporary Mathematics series - Examines problems dealing with geometric similarity and scale. Explains the tensile strength of building materials and their relationship to maximum size of a structure and discusses changes in size and proportion. Illustrates tiling patterns, two-dimensional Penrose Tilings, and their importance to crystallography. *Closed Captioned.* (COMAP;ANBERG;c1985)

Building; Crystals; Geometry

### PHOTOCHEMISTRY SERIES

For descriptions see individual titles:

INTRODUCING PHOTOCHEMISTRY [FC1513]

### PHOTOSYNTHESIS AND CELLULAR RESPIRATION

13 min; color; c,a  
1/2" VHS **NC2296,VH**

Visualizing Cell Processes Series - Uses videomicrography to illustrate the dynamic cell processes that occur at the molecular and sub-microscopic levels, including glycolysis and fermentation, mitochondrial structure, aerobic respiration, Krebs cycle, electron transport chain, ATP synthesis, chloroplast structure, light trapping by chlorophyll, the light-dependent reactions of photosynthesis, and the light-independent reactions of photosynthesis. (BIOMA;INSIGHM;c1995)

Biochemistry; Cells

### PHOTOSYNTHESIS IN PURPLE BACTERIA SERIES

19 min; color; h,c  
1/2" VHS **NC2004,VH**

Includes three programs. *Photosynthesis Without Oxygen (Molisch's Assertion)* shows the characteristics of purple bacteria. *Isolating Pure Cultures (Van Niel's Technique)* presents a step-by-step demonstration of the technique for isolating strains of purple bacteria from a raw culture. *Comparison with Higher Plants (Van Niel's Analogy)* discusses the link between bacterial and green-plant photosynthesis. (INSFWFG;IFB;c1982)

Photosynthesis

### PHYSICAL SCIENCE & YOU SERIES

Illustrates 12 basic laws of physical science by showing applications of them in real life settings.

BOILING POINT AND PRESSURE [FC1675]

BOYLE'S LAW [FC1676]

GAS DIFFUSION RATES [FC1680]

HEAT OF FUSION [FC1681]

MASS OF AN ATOM [FC1683]

MOTION OF A MOLECULE [FC1684]

THERMAL EXPANSION OF SOLIDS, LIQUIDS AND GASES [FC1686]

### PHYSIOLOGICAL CONCEPTS OF LIFE SCIENCE

35 min; color; h,c,a  
1/2" VHS **NC2299,VH**

Focuses on specific concepts in life science: the lock-and-key model of enzyme action, osmosis, active transport, cellular secretion; oxidative phosphorylation, conduction of nerve impulses, temporal and spatial summation, synaptic transmission, visual accommodation, the action of steroids on target cells, the action of T3 on target cells, cyclic AMP action, and the life cycle of HIV. (BROWNNWC;INSIGHM;c1993)

Biochemistry; Cells; Physiology

### PROTEIN SYNTHESIS SERIES

PROTEIN: THE STUFF OF LIFE [NC2309]

### PROTEIN: THE STUFF OF LIFE

10 min; color; h,c,a  
1/2" VHS **NC2309,VH**

Protein Synthesis Series - Examines various protein compounds, their biological functions, the way they bind, and how organisms synthesize the complex chains of amino acids that make up proteins. (CHAMBDA;FFHS;c1984)

Protein biosynthesis

### THE PUBLICITY OF OXYGEN

24 min; color; h,c,a  
1/2" VHS **FC1722,VH**

Examines the search for the basis of combustion and the composition of fire. Discusses the theory of phlogiston and the experiments of Joseph Priestly, Karl Wilhelm Scheele and Antoine Laurent Lavoisier, and Lavoisier's eventual discovery of oxygen. Considers the reception and effects of Lavoisier's theory by and on the scientific community. (COOPERC;MEDG;c1991)

Chemistry; Science-History; Scientists

### REMBRANDT AND HIS PAINTS

21 min; color; c,a  
1/2" VHS **RC1611,VH**

Shows the scientific methods of analysis used in the partnership between The Rembrandt Research Project and DSM Research, a Dutch chemical company, which resulted in the discovery of information about both the composition and the application of Rembrandt's paint. Follows the processes performed on the painting entitled *The Jewish Bride* as well as the attempts to replicate the paint that Rembrandt might have used in the 17th Century. Uses voice-over narration as well as interviews and demonstrations. (VISJERF;FFHS;c1993)

Art, Baroque; Artists; Chemistry, Analytic; Painting and paintings

### THE RING OF TRUTH SERIES

Award-winning scientist Philip Morrison leads viewers on an odyssey through the inner workings of science, sharing his thoughts on the underlying truth behind everyday experiences.

### RING OF TRUTH, PROGRAM 5: ATOMS

60 min; color; h,c  
1/2" VHS **FC1607,VH**

Offers a tour of the beginnings of the quest for a proof of the atom's existence, exploring the problem of trying to prove the existence of something that cannot be seen with the naked eye. Explains how science has gone further than the proof of atoms by creating a Quantum theory which outlines the inner behavior of the atom. Demonstrates the properties of atoms with illustrations from everyday life: a sandy beach; a thin oil layer on a pond; a skillful chef dividing pasta into very thin noodles; and, from the kitchens of Julia Child, a burned meal. (PBSAI;PBSV;p1987)

Chemistry, Physical; Physics

### RISE OF SCIENCE SERIES

THE PUBLICITY OF OXYGEN [FC1722]

### SCHOOL CHEMICAL EXPERIMENTS SERIES

CARBON DIOXIDE CHEMICAL REACTION RATES [FC1827]

### STRATEGIES FOR INTERFACIAL ENGINEERING

18 min; color; c,a  
1/2" VHS **FC1760,VH**

Describes advances in the understanding of colloidal and interfacial systems by demonstrating and discussing recent technology for use in the direct viewing of microstructures. Covers surfactant numbers, fluorescence life-time apparatus, video-enhanced microscopy, cryo-transmission electron microscopy, flow cells, and surface forces apparatus. (UMN;INSIGHM;c1988)

Chemistry, Physical; Engineering; Microscope and microscopy

**A STUDY OF ESTERIFICATION**

20 min; color; c,a

1/2" VHS **FC1552,VH**

Experiment: Chemistry Series - Demonstrates the reaction between an alcohol and an acid to illustrate the relationship between the kinetic extent of reaction and the maximum extent of reaction, governed by chemical equilibrium. Shows that this reaction has many industrial applications to produce a broad range of commercial products and requires strictly controlled conditions to prevent hazardous runaway reactions. (FFHS;c1986)

Chemical reaction

**THERMAL EXPANSION OF SOLIDS, LIQUIDS AND GASES**

12 min; color; j,s

1/2" VHS **FC1686,VH**

Physical Science & You Series - Demonstrates the principle "As temperature increases, density decreases because the space between molecules increases." Principle is demonstrated at a dry cleaning store where fluid with less density than air is used since it evaporates without pressure. (PHOENIX;c1986)

Chemistry; Heat; Matter; Physics

**THERMOMETRIC TITRATIONS**

20 min; color; c,a

1/2" VHS **FC1553,VH**

Experiment: Chemistry Series - Examines the temperature profiles during automated titrations of aqueous solutions of silver, zinc, nickel, and iron ions with various titrants. Shows that from the cumulative amount of titrant added to each solution at both inflection points, the stoichiometry of both the intermediate precipitate and the final aquo complex ion can be calculated. Explains that the stoichiometry of the silver (I) amine determined in the program on the applications of an electrochemical cell can be compared with the one determined by thermometric titration. (FFHS;c1986)

Chemistry

**VISUALIZING CELL PROCESSES SERIES**

Helps draw connections between the inferred molecular processes of the cell and the actual functioning of cells and entire organisms. Covers DNA replication, osmosis, motor protein action, transcription, photosynthesis, and cellular respiration.

CELLS AND MOLECULES [NC2294]

THE GENETIC CODE [NC2298]

PHOTOSYNTHESIS AND CELLULAR

RESPIRATION [NC2296]

**THE WORLD OF CHEMISTRY SERIES**

Explores the foundations of chemical structures and their behavior through theory, using computer animation, and in practice with demonstrations at industrial and research laboratories. Discusses breakthroughs and current challenges in chemistry with scientists. Hosted by Nobel laureate Roald Hoffman.

**THE WORLD OF CHEMISTRY, NO. 1: THE WORLD OF CHEMISTRY & NO. 2: COLOR**

56 min; color; c,a

1/2" VHS **FC1637,VH**

*The World of Chemistry* highlights key sequences and themes from the programs in the series. Discusses the relationships of chemistry to the sciences and everyday life. *Color* tells how the search for new colors in the mid-1800s indirectly led to the development of modern chemistry. Shows how color is used in science for everything from swimming pool test kits to DNA mapping research. *Closed Captioned.* (EFC; ANBERG;c1988)

Chemistry; Color

**THE WORLD OF CHEMISTRY, NO. 3: MEASUREMENT: THE FOUNDATION OF CHEMISTRY & NO. 4: MODELING THE UNSEEN**

56 min; color; c,a

1/2" VHS **FC1638,VH**

*Measurement: The Foundation of Chemistry* reveals how accuracy and precision are fundamental to modern chemistry. Explains the distinction between the two terms and their importance in establishing measurement standards in commerce and science. *Modeling the Unseen* reveals how models are used to explain phenomena that are beyond the realm of ordinary perception. Discusses how models used by scientists often represent flights of intuition and invention. Emphasizes one classic model that explains the behavior of gases. *Closed Captioned.* (EFC; ANBERG;c1988)

Chemistry

**THE WORLD OF CHEMISTRY, NO. 9: MOLECULAR ARCHITECTURE & NO. 10: SIGNALS FROM WITHIN**

56 min; color; c,a

1/2" VHS **FC1641,VH**

*Molecular Architecture* explains how the shape and physical properties of a molecule are determined by the electronic structure of its elements and their bonds. Reveals how living organisms distinguish between similar molecules (isomers). *Signals from Within* explains how atoms and molecules can be made to communicate, and how scientists interpret their language. Discusses chemists' knowledge of the interaction of radiation and matter, which is the basis for analytical methods of sensitivity and specificity. Shows how these are used in very different laboratory situations. *Closed Captioned.* (EFC;ANBERG;c1988)

Chemistry, Analytic; Chemistry, Physical

**THE WORLD OF CHEMISTRY, NO. 11: THE MOLE & NO. 12: WATER**

56 min; color; c,a

1/2" VHS **FC1642,VH**

*The Mole* discusses the mole, a concept on which the foundation of quantitative chemistry rests. Uses Avogadro's law to show how the mass of a substance can be related to the number of particles contained in that mass. Reveals how the mole allows chemists to count by weighing. *Water* explores the special chemical properties of water and why water is unique and necessary for life. Reviews the protection and conservation of water as a resource. *Closed Captioned.* (EFC;ANBERG;c1988)

Chemistry, Physical

**THE WORLD OF CHEMISTRY, NO. 13: THE DRIVING FORCES & NO. 14: MOLECULES IN ACTION**

56 min; color; c,a

1/2" VHS **FC1643,VH**

*The Driving Forces* discusses why chemical reactions occur and what controls their speed. Investigates endothermic and exothermic reactions. Reveals the role of entropy. *Molecules in Action* shows how observing molecules during chemical reactions explains the role catalysts play in chemical transformations. Demonstrates the state of dynamic equilibrium, which allows chemists and chemical engineers to change reaction conditions. *Closed Captioned.* (EFC; ANBERG;c1988)

Chemical reaction

**THE WORLD OF CHEMISTRY, NO. 15: THE BUSY ELECTRON & NO. 16: THE PROTON IN CHEMISTRY**56 min; color; c,a  
1/2" VHS **FC1644,VH**

*The Busy Electron* discusses how chemical reactions produce electricity. Explains the principles of electrochemical cell design. Presents examples of its use, including batteries, sensors, and a solar-powered car. *The Proton in Chemistry* explains through demonstrations what pH is and how it is measured. Discusses how acids and bases play an important role in our lives but are sometimes safe and sometimes dangerous. *Closed Captioned.* (EFC;ANBERG;c1988)

Chemistry; Electrochemistry

**THE WORLD OF CHEMISTRY, NO. 17: THE PRECIOUS ENVELOPE & NO. 18: THE CHEMISTRY OF THE EARTH**56 min; color; c,a  
1/2" VHS **FC1645,VH**

*The Precious Envelope* examines the chemistry of earth's atmosphere. Explains the theories of chemical evolution, ozone depletion, and the greenhouse effect. *The Chemistry of the Earth* investigates the force that distributes earth's mineral resources from the interior to the surface. Looks at the elements from the earth and how the common element silicon has become a cornerstone of the modern high-tech industry. *Closed Captioned.* (EFC;ANBERG;c1988)

Chemistry

**THE WORLD OF CHEMISTRY, NO. 19: METALS & NO. 20: ON THE SURFACE**56 min; color; c,a  
1/2" VHS **FC1646,VH**

*Metals* examines the important properties of metals—malleability, ductility, and conductivity. Covers the methods used to extract metals from ore and how to blend metals to form alloys with improved physical characteristics. *On the Surface* explains how surfaces react with each other at the molecular level and are unique in their catalytic behavior in chemical reactions. Discusses the chemistry of surfaces as a special branch of chemistry—surface science. *Closed Captioned.* (EFC;ANBERG;c1988)

Chemistry; Chemistry, Inorganic

**THE WORLD OF CHEMISTRY, NO. 21: CARBON & NO. 22: THE AGE OF POLYMERS**56 min; color; c,a  
1/2" VHS **FC1647,VH**

*Carbon* discusses organic chemistry, the study of carbon compounds. Shows how the versatility of carbon's molecular structures provides the enormous range of properties of its compounds. *The Age of Polymers* explains how polymers are made and how they are different. Explores how chemists control the molecular structure to create polymers with special properties. *Closed Captioned.* (EFC;ANBERG;c1988)

Biochemistry; Chemistry, Organic

**THE WORLD OF CHEMISTRY, NO. 23: PROTEINS: STRUCTURE AND FUNCTION & NO. 24: THE GENETIC CODE**56 min; color; c,a  
1/2" VHS **FC1648,VH**

*Proteins: Structure and Function* discusses proteins, which are polymers built of amino acids. Explains how a large number of different protein molecules arise from only 20 basic amino acids. Shows how the number, kind, and sequence of amino acids in the polypeptide chain dictate the level of structure. *The Genetic Code* investigates the structure and role of the nucleic acids DNA and RNA. Discusses how the human body manufactures complex proteins to sustain life and how traits are passed from generation to generation. *Closed Captioned.* (EFC;ANBERG;c1988)

Biochemistry; Genetics; Protein biosynthesis

**THE WORLD OF CHEMISTRY, NO. 25: CHEMISTRY AND THE ENVIRONMENT & NO. 26: FUTURES**56 min; color; c,a  
1/2" VHS **FC1649,VH**

*Chemistry and the Environment* discusses how modern chemistry has provided benefits and products, but also chemical waste problems. Examines the tools, techniques, and frustration of dump site waste management. *Futures* reviews the basic principles of the series. Explores the frontiers of chemical research through interviews with leaders from academia and industry. *Closed Captioned.* (EFC;ANBERG;c1988)

Chemistry; Pollution