



# Electrochemistry

Science

TVO 1986

Science SOL CH.3, CH.6

6 10-minute programs for grades 11-12

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This lively series commences by taking chemistry students inside the common, everyday battery, and explaining the basic principles involved. It then illustrates the terminology and processes of electrochemical reactions, how half-cell potentials can be determined, and how electrochemistry is at work in the commercial Leclanche cell, as well as the processes of corrosion and electrolysis.

**101. The Building Blocks of Electrochemistry**—Basic concepts of electrochemistry are introduced with the aid of a robot powered by an electrochemical cell. The chemical reactions that occur inside the cell demonstrate the principles of reduction and oxidation—the redox reactions—that produce the flow of electrons in the cell.

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**102. Electrochemical Cells**—The operation of an electrochemical cell is shown with a laboratory model of a zinc-copper cell. Animation at the atomic level shows that differences in activity levels determine the effectiveness of the electrochemical cell.

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**103. Designing Electrochemical Cells**—This program shows how to build a super electrochemical cell, explaining the need for a standard half cell, how to predict the direction of the electron flow, and finally, how a table of reduction potentials can predict the output of a cell.

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**104. Commercial Electrochemical Cells**—This program demonstrates how chemical reactions studied in previous programs apply to commercially available batteries. The development of the modern battery is traced, highlighting the discoveries of Galvani and Volta, the widely used Leclanche cell, and rechargeable cells.

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**105. Corrosion**—An investigation of the question: why does rust develop? The oxidation-reduction reaction that produces corrosion is shown, explaining the role of the electrochemical cell. Ways to prevent and control corrosion by galvanization and cathodic protection are illustrated.

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**106. Electroplating**—The causes and results of electrolysis, a non-spontaneous reaction requiring a source of electrical energy, are shown through animation. Studying the reduction potentials for each possible half-cell reaction enables us to predict which reaction will occur.

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