

# Electrochemistry



## Chapter Pacing Guide

Please note that this pace is based on completing selected sections of the text in 90 classes, approximately 90 minutes each. Refer to the Course Planning Guide on page xvii of this booklet for a complete list of time allotments assigned to each section. Less time can be allocated for each chapter if you plan to teach all 26 chapters.

Period	Content
1	21.1 Voltaic Cells
0.5	21.2 Types of Batteries
1	21.3 Electrolysis
0.5	Review and Assessment

# Voltaic Cells pages 663–672

**Key:** SE = Student Edition,  
TWE = Teacher Wraparound Edition,  
TCR = Teacher Classroom Resources

**National Science Content Standards:** UCP.1, UCP.3; B.3, B.6; E.2; G.3

**Georgia QCC:** 1, 1.2, 2.1, 3.1, 9.1, 9.6, 12, 13, 13.1

## Objectives

- **Describe** a way to obtain electrical energy from a redox reaction.
- **Identify** the parts of a voltaic cell and explain how each part operates.
- **Calculate** cell potentials and **determine** the spontaneity of redox reactions.

## Lesson Resources

- \_\_\_\_\_ Section Focus Transparency 78 and Master
- \_\_\_\_\_ Math Skills Transparency 32 and Master
- \_\_\_\_\_ Teaching Transparency 63 and Master
- \_\_\_\_\_ *ChemLab and MiniLab Worksheets*, pp. 82–84  
TCR
- \_\_\_\_\_ *Study Guide for Content Mastery*, pp. 121–123  
TCR

- \_\_\_\_\_ **MindJogger Videoquizzes**, Ch. 21
- \_\_\_\_\_ **Guided Reading Audio Program**, Section 21.1
- \_\_\_\_\_ **Cosmic Chemistry Videodisc**, Disc 3, Side 5
- \_\_\_\_\_ *Using the Internet in the Science Classroom*, TCR
- \_\_\_\_\_ Chemistry Web site: [ga.science.glencoe.com](http://ga.science.glencoe.com)

## Optional Resources

- \_\_\_\_\_ *Challenge Problems*, p. 21 TCR
- \_\_\_\_\_ *CBL Laboratory Manual*, pp. 37–40 TCR
- \_\_\_\_\_ *Solving Problems: A Chemistry Handbook*,  
Section 21.1 TCR
- \_\_\_\_\_ *Spanish Resources 21.1* TCR

## Multimedia Resources

- \_\_\_\_\_ **Chemistry Interactive CD-ROM**, Section 21.1  
Experiment, Demonstration, and Video

## Lesson Plan

Activity	Resources	Suggested Time
<b>Classroom Management</b> <ul style="list-style-type: none"> <li>• Display the Section Focus Transparency and have students answer the questions.</li> <li>• Distribute the corrected Chapter 20 tests.</li> </ul>	Section Focus Transparency 78 and Master	5 minutes
<b>Core Lesson</b> <ul style="list-style-type: none"> <li>• Teach the main concepts of Section 21.1.</li> <li>• Have students read the ChemLab and begin preparations. (Note: this lab will take one period to complete. Time adjustments may be necessary in subsequent lessons.)</li> </ul>	TWE, pp. 663–672 SE, pp. 688–689	60 minutes
<b>In-Class Check</b> <ul style="list-style-type: none"> <li>• Reinforce Section 21.1 concepts using the Performance Assessment.</li> <li>• Complete the Check for Understanding and Reteach strategies.</li> </ul>	TWE, p. 671 TWE, p. 672	20 minutes
<b>Homework</b> <ul style="list-style-type: none"> <li>• Ask students to answer the questions from the Knowledge Assessment and Reinforcement strategies.</li> <li>• Have students complete Section 21.1 Assessment.</li> <li>• Assign relevant questions from Chapter 21 Assessment.</li> </ul>	TWE, p. 666 SE, p. 672 SE, pp. 692–695	5 minutes

[total = 90 minutes]

# Types of Batteries *pages 673–682*

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**National Science Content Standards:** UCP.1, UCP.3; A.1; B.3, B.6; E.1, E.2; F.6; G.1, G.3

**Georgia QCC:** 1, 3.1, 4, 9.6, 13

## Objectives

- **Describe** the structure, composition, and operation of the typical carbon-zinc dry cell battery.
- **Distinguish** between primary and secondary batteries and give two examples of each type.
- **Explain** the structure and operation of the hydrogen-oxygen fuel cell.
- **Describe** the process of corrosion of iron and methods to prevent corrosion.

## Lesson Resources

- \_\_\_\_\_ Section Focus Transparency 79 and Master
- \_\_\_\_\_ Math Skills Transparency 33 and Master
- \_\_\_\_\_ Teaching Transparency 64 and Master
- \_\_\_\_\_ *ChemLab and MiniLab Worksheets*, p. 81 TCR
- \_\_\_\_\_ *Study Guide for Content Mastery*, pp. 124–125 TCR

- \_\_\_\_\_ **Guided Reading Audio Program**, Section 21.2
- \_\_\_\_\_ **Cosmic Chemistry Videodisc**, Disc 2, Side 3; Disc 3, Side 5
- \_\_\_\_\_ *Using the Internet in the Science Classroom*, TCR
- \_\_\_\_\_ Chemistry Web site: [ga.science.glencoe.com](http://ga.science.glencoe.com)

## Multimedia Resources

- \_\_\_\_\_ **Chemistry Interactive CD-ROM**, Section 21.2 Animation and Exploration
- \_\_\_\_\_ **MindJogger Videoquizzes**, Ch. 21

## Optional Resources

- \_\_\_\_\_ *Solving Problems: A Chemistry Handbook*, Section 21.2 TCR
- \_\_\_\_\_ *Spanish Resources 21.2 TCR*

## Lesson Plan

Activity	Resources	Suggested Time
<b>Classroom Management</b> <ul style="list-style-type: none"> <li>• Display the Section Focus Transparency and have students answer the questions.</li> <li>• Have students check homework answers.</li> </ul>	Section Focus Transparency 79 and Master TWE, pp. 666, 672, 692–695	5 minutes
<b>Discussion</b> <ul style="list-style-type: none"> <li>• Answer any questions about homework.</li> </ul>	TWE, pp. 666, 672, 692–695	5 minutes
<b>Core Lesson</b> <ul style="list-style-type: none"> <li>• Introduce Section 21.2 with the Quick Demo.</li> <li>• Teach the main concepts of Section 21.2.</li> </ul>	TWE, p. 674 TWE, pp. 673–682	20–25 minutes
<b>In-Class Check</b> <ul style="list-style-type: none"> <li>• Complete the Check for Understanding and Reteach strategies.</li> </ul>	TWE, p. 682	5–10 minutes
<b>Homework</b> <ul style="list-style-type: none"> <li>• Have students complete Section 21.2 Assessment.</li> <li>• Assign relevant questions from Chapter 21 Assessment.</li> <li>• Ask students to complete the Chemistry Journal assignment.</li> </ul>	SE, p. 682 SE, pp. 692–695 TWE, p. 681	5 minutes

[total = 45 minutes]

# Electrolysis *pages 683–687*

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**Georgia QCC:** 1, 1.1, 1.2, 2, 2.1, 3.1, 4, 5.2, 9.6, 13, 13.1, 15.4

## Objectives

- **Describe** how it is possible to reverse a spontaneous redox reaction in an electrochemical cell.
- **Compare** the reactions involved in the electrolysis of molten sodium chloride with those in the electrolysis of brine.
- **Discuss** the importance of electrolysis in the smelting and purification of metals.

## Lesson Resources

- \_\_\_\_\_ Section Focus Transparency 80 and Master
- \_\_\_\_\_ Teaching Transparency 65 and Master
- \_\_\_\_\_ *Study Guide for Content Mastery*, p. 126 TCR

- \_\_\_\_\_ *Using the Internet in the Science Classroom*, TCR
- \_\_\_\_\_ Chemistry Web site: [ga.science.glencoe.com](http://ga.science.glencoe.com)

## Multimedia Resources

- \_\_\_\_\_ **Chemistry Interactive CD-ROM**, Section 21.3 Demonstration and Video
- \_\_\_\_\_ **MindJogger Videoquizzes**, Ch. 21
- \_\_\_\_\_ **Guided Reading Audio Program**, Section 21.3
- \_\_\_\_\_ **Cosmic Chemistry Videodisc**, Disc 2, Side 3; Disc 2, Side 4

## Optional Resources

- \_\_\_\_\_ *Forensics Laboratory Manual*, pp. 29–42 TCR
- \_\_\_\_\_ *Laboratory Manual*, pp. 161–168 TCR
- \_\_\_\_\_ *Solving Problems: A Chemistry Handbook*, Section 21.3 TCR
- \_\_\_\_\_ *Spanish Resources 21.3* TCR
- \_\_\_\_\_ *Supplemental Problems*, pp. 33–34 TCR

## Lesson Plan

Activity	Resources	Suggested Time
<b>Classroom Management</b> <ul style="list-style-type: none"> <li>• Display the Section Focus Transparency and have students answer the questions.</li> <li>• Have students check homework answers.</li> </ul>	Section Focus Transparency 80 and Master TWE, pp. 681, 682, 692–695	5 minutes
<b>Discussion</b> <ul style="list-style-type: none"> <li>• Answer any questions about homework.</li> </ul>	TWE, pp. 681, 682, 692–695	5 minutes
<b>Core Lesson</b> <ul style="list-style-type: none"> <li>• Introduce Section 21.3 with the Quick Demo.</li> <li>• Teach the main concepts of Section 21.3.</li> </ul>	TWE, p. 685 TWE, pp. 683–687	50 minutes
<b>In-Class Check</b> <ul style="list-style-type: none"> <li>• Reinforce Section 21.3 concepts using the Chemistry Journal.</li> <li>• Complete the Check for Understanding and Reteach strategies.</li> <li>• Complete the Knowledge Assessment.</li> <li>• Answer questions on Chapter 21 to prepare students for the test.</li> </ul>	TWE, p. 685 TWE, p. 687 TWE, p. 687 TWE, pp. 662–695	25 minutes
<b>Homework</b> <ul style="list-style-type: none"> <li>• Have students complete Section 21.3 Assessment.</li> <li>• Assign relevant questions from Chapter 21 Assessment.</li> <li>• Assign supplemental problems to prepare students for the test.</li> </ul>	SE, p. 687 SE, pp. 692–695 Supplemental Problems, pp. 33–34 TCR	5 minutes

[total = 90 minutes]

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## Assessment Resources

- \_\_\_\_\_ *Chapter Assessment*, Ch. 21 TCR
- \_\_\_\_\_ *Performance Assessment in the Science Classroom*, TCR
- \_\_\_\_\_ *Alternate Assessment in the Science Classroom*, TCR
- \_\_\_\_\_ *Reviewing Chemistry: Mastering the Georgia QCC*, TCR

## Multimedia Resources

- \_\_\_\_\_ **MindJogger Videoquizzes**, Ch. 21
- \_\_\_\_\_ **TestCheck Software**, Ch. 21
- \_\_\_\_\_ **Chemistry Interactive CD-ROM**, Ch. 21 quiz
- \_\_\_\_\_ **Vocabulary PuzzleMaker Software**, Ch. 21

Activity	Resources	Suggested Time
<b>Classroom Management</b> <ul style="list-style-type: none"> <li>• Have students check homework answers.</li> </ul>	<i>TWE</i> , pp. 687, 692–695 <i>Supplemental Problems</i> , pp. 33–34 TCR	5 minutes
<b>Reviewing the Chapter</b> <ul style="list-style-type: none"> <li>• Answer any questions about homework.</li> <li>• Answer any final questions about Chapter 21.</li> </ul>	<i>Supplemental Problems</i> , pp. 33–34 TCR <i>TWE</i> , pp. 662–695	5 minutes
<b>Assessment</b> <ul style="list-style-type: none"> <li>• Distribute the test and allow students to work quietly.</li> </ul>	<i>Chapter Assessment</i> , pp. 121–126 TCR	30–35 minutes
<b>Closing</b> <ul style="list-style-type: none"> <li>• As students complete the test, have them read the Chapter 22 Opener.</li> <li>• If students have time, let them explore the Chemistry Online for Chapter 22.</li> </ul>	SE, p. 696  <a href="http://ga.science.glencoe.com">ga.science.glencoe.com</a>	0–5 minutes

[total = 45 minutes]