

National Geographic Learning, a part of Cengage in Partnership with the Home Builders Institute

The Residential Construction Academy Series

Setting the Standard for Home Building Excellence!



- National Skill Standards
- Instructor Certification
- Student Certification
- Program Credentialing
- National Registry
- Pre-Apprenticeship Certificate Training
- RCA Series:
Full Curriculum aligned to all Certification Levels with Digital Courseware

The products and services offered through the Residential Construction Academy (RCA) Series establish a direct link from education and training programs to the construction industry, offering you a better way to build a program based on the foundation of National Skill Standards for residential construction.

NATIONAL SKILL STANDARDS

The RCA Series is the only program based upon National Skill Standards for residential construction. The National Association of Home Builders (NAHB) is the largest network of craftsmen, innovators and problem solvers dedicated to building and enriching communities. HBI/NAHB brought together industry experts from across the U.S. to meet with an independent research and measurement organization to develop these new craft trade training standards. The guidelines from the National Skills Standards Board were used in developing these industry-based standards. In addition, the process met or exceeded the American Psychological Association (APA) and American National Standards Institute (ANSI) standards for occupational credentialing.

THE RESIDENTIAL CONSTRUCTION ACADEMY (RCA) SERIES

Once the National Skill Standards were created, National Geographic Learning, a part of Cengage brought together an expert group of authors to create learning materials based upon the National Skill Standards. Consistent in their approach and thorough in their coverage

of the National Skill Standards content and competencies, the RCA Series texts were designed first and foremost with educating students in mind. Rich in pedagogy and step-by-step procedures, using four-color illustrations and photographs that teach in short segmented readings, these texts are designed to teach by doing. Robust instructor material support is available as well as classroom multimedia and workbooks.

PRE-APPRENTICESHIP CERTIFICATE TRAINING (PACT)

The HBI PACT curriculum is one of only three U.S. Department of Labor recognized pre-apprenticeship curricula. HBI PACT curriculum integrates contextual, work-based learning with vocational and academic skills training in the classroom. These include employability and life skills, career development, and on-the-job training. HBI PACT is a uniquely effective training tool that offers students a range of stackable credentials leading to employment and successful careers in the building industry. All PACT credentials align to the National Skill Standards and the RCA Series textbooks.



The Residential Construction Academy (RCA) Series

CERTIFICATION FOR RESIDENTIAL CONSTRUCTION

HBI/NAHB offers certification protocols for instructors and students. HBI/NAHB has partnered with The Ohio State University (OSU) for instructor certification and the National Occupational Competency Testing Institute (NOCTI) for student certification; both are offered online. If your instructor and students become certified, your program is eligible for credentialing as well.

INSTRUCTOR CERTIFICATION

HBI/NAHB offers instructor industry certification to ensure consistency in instructor teaching/training methodologies and knowledge competency when teaching to the HBI/NAHB National Skill Standards contained throughout the RCA Series curriculum. If an instructor is teaching from the RCA Series but chooses not to take the instructor certification course work, his/her students are still eligible for HBI/NAHB student certification. Instructor Certification is valid for five years.

Certification courses are offered online in partnership with The Ohio State University and applications are reviewed by HBI/NAHB. The instructor is awarded 2 CEUs for successful completion.

Certification Details:

- Certification will be taught in 16 distinct online modules, constituting the course.
- 7 of the 10 questions must be correct to successfully complete a module.
- 13 of the 16 modules must be successfully completed for certification.
- You have 6 consecutive weeks to complete all 16 modules.
- You are given one opportunity to retest on any module for which you did not receive a passing score.

STUDENT CERTIFICATION

With HBI/NAHB student certifications, students will be more marketable in the industry as they demonstrate their skill in construction procedures and competencies, allowing future employers to see these students as highly-qualified candidates. All tests are based on National Industry Skills Standards as are the materials contained in the Residential Construction Academy Series.

The testing areas available include PACT (Pre-Apprenticeship), secondary, post-secondary and industry levels for:

- **Basic Principles for Construction**
- **Carpentry**
- **House Wiring**
- **HVAC**
- **Plumbing**
- **Facilities Maintenance**

Certification Details:

- Tests for Student Certification may be ordered through the NOCTI website at www.nocti.org. Certification assessments are based on national skill standards set by NAHB industry professionals and educators.
- Instructors are given the option of determining the testing level for their students. Certification testing is offered at three proficiency levels: entry, semi-skilled and skilled.

PROGRAM CREDENTIALING

Give your program the prestige and national recognition that comes with Program Credentialing. HBI/NAHB will now consider your program for credentialing provided the instructor and students are participating in the HBI/NAHB certification process and the Residential Construction Academy Series materials are being used in the program.

A *credentialled program must meet the following six criteria:*

- 1) Training program utilizes NAHB's Residential Construction Skill Standards.
- 2) Instructors must be certified by HBI/NAHB through The Ohio State University online professional development program.
- 3) Students complete the industry-approved HBI/NAHB online tests administered by NOCTI.
- 4) HBI/NAHB receives and industry experts review one or more of the following for program validation: lesson plans, course description, syllabi or other official type of course outline for non-HBI Job Corps programs, copies of student test scores.
- 5) HBI/NAHB receives and approves the completed Application for Credentialing.
- 6) **Training program purchases and teaches with RCA Series materials.**

NATIONAL REGISTRY

Join the nation-wide construction job-bank of the leading residential construction association, the National Association of Home Builders. The registry lists all students who have successfully completed the RCA series instruction and links them via an online job-bank database to potential employers across the USA. The registry allows students to place their resume online and reach a national audience of future employers, topping off the series with real-world success. Visit the NAHB Career Center at www.nahb.org/careers.



Spend Less Time Planning And More Time Teaching!

INSTRUCTOR COMPANION SITE

Preparing for class and evaluating students has never been easier with National Geographic Learning, a part of Cengage Instructor Resources!

Instructor Companion Sites contain:

- Customizable Test Banks for each chapter
- Image Galleries to enhance your presentations in PowerPoint format, insert into test questions, or add as visuals wherever you need them
- Customizable presentations in PowerPoint format
- Solution Files
- Math Review
- Instructor's Resource Guide
- Additional Activities

INSTRUCTOR'S GUIDE

Available for each Residential Construction Academy topic is an accompanying printed Instructor's Resource Guide. This resource includes:

- Answers to review questions in the book
- Lecture outlines
- Lab exercises (when applicable)

DVDS

This DVD series provides step-by-step instruction of important concepts for the topics discussed in each book. The videos are:

- Easy to follow
- Include full color graphics and animations from all regions of the country
- Accompanied by an Instructor Manual to facilitate classroom integration



The Online Solution for CTE Courses

MindTap's customizable Learning Path begins with core content in the MindTap™ reader and videos.



Progress and reporting tools allow you to track student grades, progress, and levels of engagement in real time.



MindTap for the RCA series includes Soft Skills Modules and Certification for:

- Communication Skills
- Professionalism
- Customer Service
- Telephone Skills
- Meeting Management
- and Successful Team Meetings



RCA Series Features

This innovative series was designed with input from educators and industry and informed by the curriculum and training objectives established by the Standards Committee.

- **From Experience** boxes highlight proven methods used by construction pros to get the job done right and on time.
- **Hands-on Procedures** located at the ends of chapters make it easy to review skills and techniques.
- **Caution** features highlight safety issues and present urgent safety reminders for those working with the various tools in the industry so that students can avoid potential mishaps.
- **Success Stories** open each section, providing insights, advice, and motivation from professionals working in a variety of construction trades and offering an insider's view of construction as a career.
- **A Glossary** and a combined **Glosario** in the back of each book provides a handy reference for students and instructors written in both English and Spanish.

RCA Series aligned to the National Skill Standards for Residential Construction

- **Green Tips** are included throughout the book to highlight existing or new information pertaining to environmentally-friendly and sustainable practices.
- **Consider and Compare** illustrated and describes various practices being demonstrated on actual jobsites, leaving it up to the learner to evaluate the situation and determine if the practices are smart and safe—or not.
- **Green Checklists** located at the end of chapters highlight the chapter's environmentally friendly and sustainable writing practices coverage and provide a quick reference for students.
- **Know Your Codes** teach code book use and strengthens the knowledge of local codes and research capabilities on a job site.
- **From Experience** provides tricks of the trade and practical advice that make a particular task a little easier for the novice to accomplish.

Success Stories

Michael E. C. Surguy
 Owner, Michael E. C. Surguy Carpenter Contractors, Inc., in New Providence, NJ

EDUCATION
 Michael completed high school and attended vocational school studying carpentry. He later obtained his Associate degree in Occupational Studies from the State University of New York at Delhi.

HISTORY
 After working as a carpenter and woodworker for a number of years, Michael established his own business; he is the sole owner of Michael E. C. Surguy Carpenter Contractor, Inc. Michael's company does basic framing to complex remodeling and additions, working on \$3-\$4 million homes. A recipient of the Community Builders Association of New Jersey's Sub-Contractor of the Year Award, Surguy is one of New Jersey's specialized carpentry contractors.

ON THE JOB
 In a typical day, Michael says, "I need to be on the job. I don't just set up my guys and leave. I have a tool belt on every day. People pay me to be there and work. If I'm not there, the work doesn't get done. If you get the job, you need to be there and run the job."

BEST ASPECTS
 Michael has a deep commitment to his work: "You really need to enjoy it and be passionate about it. I don't think it's with every type of job. In carpentry, you are using your head and your body. There's no price to pay for the wear and tear on your body. Every 2 x 10-24 feet piece of wood you need to carry with passion. If you show up for work in the morning, and you're thinking that it's too heavy or it's too cold outside, you won't do it."

CHALLENGES
 While Michael shares that the carpentry business has been good to him, he explains that building a business is stressful. "When I started out, I lived at my parents' house. I made nothing for the first three years, but my guys always got paid. I got my tools and paid my insurance. If I hadn't lived at home, there's no way I could have done it." Michael says he built his reputation doing jobs that he thought he could do and being honest with his bids, breaking down each job, figuring out the cost of materials and employees. At first, he took on small jobs, which turned into bigger jobs. He started out as sole proprietor and then became a corporation with employees. "Now it's a different ballgame. You have to have liability insurance, it's a business," he notes.

Michael also comments on the challenges of dealing with changes in the economy. "You can't just frame now. There's not enough work. Four years ago, Surguy Construction was doing seven to eight custom houses each year. Now we're only doing three or four a year." In response to the economic downturn, Michael has



SECTION 2 Residential Service Entrances and Equipment

CAUTION
 Electricians use ladders, scaffolding, and aerial lifts when they are installing service entrances. Always observe and follow the proper safety procedures when using ladders, scaffolds, and aerial lifts. Electricians will also need to wear the proper personal protective equipment when installing service entrances. This equipment should include at a minimum safety glasses, hard hats, rugged work shoes, and gloves to protect your hands from cuts and bruises.

Installing an Overhead Service Using Service Entrance Cable
 The procedure for installing an overhead service entrance using service entrance cable will vary slightly depending on whether the house has a full basement, a crawl space, or is built on a concrete slab. The installation steps outlined next assume that a full basement is available and that the service equipment will be located there. The steps used to install an overhead service entrance with service entrance cable (Figure 8-17) installed on the side of the house are as follows:

1. Install a threaded hub and rain-tight connector on the meter socket (Figure 8-18). The threaded hub is attached to the meter socket using the four screws that come with the threaded hub. The rain-tight connector is screwed into the hub by hand and then tightened securely in place with an adjustable wrench or pump pliers.
2. Locate and install the meter socket. The meter socket is typically installed at a height that will provide a measurement of 4 to 5 feet above ground level to the center of the kilowatt-hour meter (Figure 8-19). This is not an NEC® requirement but rather a requirement by the

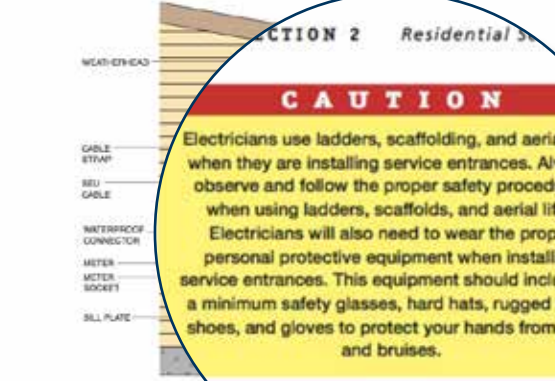


FIGURE 8-17 A service entrance installation using service entrance cable.

from experience...

Aerial lifts have replaced ladders and scaffolding on many residential job sites due to their mobility and flexibility. They may be made of metal, fiberglass reinforced plastic, or other materials. Many workers are injured or killed on aerial lifts each year. Therefore, only trained and authorized persons are allowed to operate

CHAPTER 1 Residential Workplace Safety 27

TOOL SAFETY
 The safe and proper use of the tools used to install residential electrical systems is very important. If a tool comes with an owner's manual, read it! The place where you bought the tool is also an excellent source to find out how to safely and properly use the tool. A residential electrician should consider the following items:

- Use the right tools for the job. Be sure that they are in good working order.
- Use only those power tools for which you have received proper instruction.
- Use tools for their intended purpose (for example, pliers are not to be used for hammering) (Figure 1-26).
- Portable power tools should be provided with a three-prong grounding plug for attachment to a grounding-type receptacle unless it is a double-insulated power tool.
- Sharp-edged or pointed tools should be carried in tool pouches and not in clothing pockets.

FIGURE 1-26 Use tools properly. Do not hammer with a pair of pliers like this electrician is doing. Personal injury can result from not using a tool properly.



from experience...

Aerial lifts have replaced ladders and scaffolding on many residential job sites due to their mobility and flexibility. They may be made of metal, fiberglass reinforced plastic, or other materials. Many workers are injured or killed on aerial lifts each year. Therefore, only trained and authorized persons are allowed to operate an aerial lift. Employers are required to retrain workers who they observe operating an aerial lift improperly. The following OSHA standards apply to aerial lifts: 29 CFR 1910.67, 29 CFR 1910.269(p), 29 CFR 1926.21, 29 CFR 1926.453, and 29 CFR 1926.502. Make sure you are properly trained before using any aerial lift.

RCA

Basic Principles for Construction, 5E



ISBN: 9781337913829
Mark Huth, ©2020

Featuring a basic, step-by-step approach that makes even complex concepts easier to understand, as well as an engaging, full-color design and numerous photos and figures, RESIDENTIAL CONSTRUCTION ACADEMY: BASIC PRINCIPLES FOR CONSTRUCTION, Fifth Edition, is ideal for readers beginning careers in the building

trades industry. The new edition includes numerous updates to provide readers with the latest information on today's industry standards, notable trends, advances in technology and techniques, and current best practices. The author also covers fundamental knowledge and skills necessary for success in the field, including work ethics, safety procedures, construction mathematics, communications, print reading, and common tools.

FEATURES

- **NEW** A new chapter focused on adhesives and sealants provides helpful exposure to these common products used in residential construction.
- **NEW** Additional coverage of nail guns and nail types gives students helpful exposure to this essential equipment used in today's building trades.
- Comprehensive coverage of a broad range of professional topics makes this a must-have resource for students interested in entering the industry.
- Vibrant, full-color photos and detailed illustrations help bring important concepts to life and familiarize students with the latest equipment and procedures.
- The author includes useful information on basic math concepts, work ethic guidelines, and other practical professional topics often omitted from traditional building trades books.

CONTENTS

Organization of the Industry. Working in the Industry. Introduction to Green Building. Jobsite Safety. Safety with Ladders, Scaffolds, and Machines. Construction Math. Whole Numbers. Decimals. Fractions. Linear Measure. Percent (Percentage). Area and Volume. Right Angles. Combined Operations. Hand Tools-Selection, Use and Care. Power Tools-Selection, Use, and Care. Fasteners. Rigging. Views. Scales. Alphabet of Lines. Use of Symbols. Plan Views. Elevations. Sections and Details.

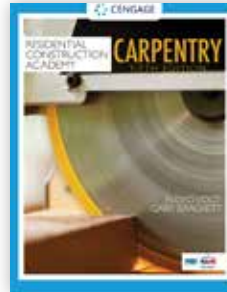
SUPPLEMENTS

Workbook ISBN: 9781337913850
Instructor's Guide ISBN: 9781337913836
MindTap with full, interactive ebook ISBN: 9780357140215



RCA

Carpentry, 5E



ISBN: 9781337918503
Floyd Vogt, ©2020

RESIDENTIAL CONSTRUCTION ACADEMY: CARPENTRY, Fifth Edition, provides a logical, sequential introduction to essential construction topics. Each chapter begins with learning objectives and a glossary, features relevant pictures and diagrams to reinforce key ideas, and concludes with construction

procedures and review questions. Throughout the text, the authors also highlight important techniques, tools, materials, code requirements, and best practices associated with constructing a residential building.

FEATURES

- "Know Your Codes" features prompt students to research building codes that will impact each job, providing excellent practice for this critical on-the-job skill.
- Green Tips and Green Checklists highlight advice and current topics related to "green" construction methods.
- A strong emphasis on safety. Readers learn from insightful tips and precautions that are integrated throughout the book to help them develop careful practices.

CONTENTS

Hand Tools. Power Tools. Stationary Power Tools. Wood and Wood Products. Fasteners. Jobsite Safety and Construction Aids. Building Plans and Codes. Building Layout. Concrete Form Construction. Floor Framing. Wall and Ceiling Framing. Roof Framing. Roofing. Windows and Doors. Siding and Decks. Insulation and Ventilation. Wall Finish. Interior Finish. Stair Framing and Finish. Cabinets and Countertops.

SUPPLEMENTS

Workbook ISBN: 9781337918541
Instructor's Resource Kit ISBN: 9781337918527
MindTap with full, interactive ebook ISBN: 9780357127797



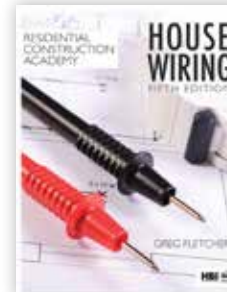
MINDTAP FOR CARPENTRY AND HOUSE WIRING

include Residential Code Simulations, which test student knowledge of ICC and NEC building codes with a virtual residential construction site.



RCA

House Wiring, 5e



ISBN: 9781337402415
Greg Fletcher, ©2019

Completely up to date with the 2017 edition of the National Electrical Code, RESIDENTIAL CONSTRUCTION ACADEMY: HOUSE WIRING, 5e delivers a concrete approach to teaching the latest and best practices in residential electrical wiring. This vividly illustrated, full-color text is based on the HBI National Skill Standards that cover the skill sets necessary to

achieve a first job in construction or as an electrician. The text provides thorough coverage of "green" topics, sustainable building practices, alternative energy systems, and much more. "From Experience" sections address common residential wiring practices and scenarios, while "Caution" boxes emphasize the ongoing importance of safety.

FEATURES

- Reflecting the latest practices from the field, all material is updated to the 2017 edition of the National Electrical Code.
- Comprehensive coverage in Ch. 22 Alternative Energy System Installation includes photovoltaics and small wind turbines.
- A wealth of end-of-chapter review questions reinforce material covered and improve student critical thinking skills—helping students maximize their study time and course success.

CONTENTS

Residential Workplace Safety. Hardware and Materials Used in Residential Wiring. Tools Used in Residential Wiring. Test and Measurement Instruments Used in Residential Wiring. Understanding Residential Building Plans. Determining Branch Circuit, Feeder Circuit, and Service Entrance Requirements. Introduction to Residential Service Entrances. Service Entrance Equipment and Installation. General Requirements for Rough-In Wiring. Electrical Box Installation Cable Installation. Raceway Installation. Switching Circuit Installation. Branch-Circuit Installation. Special Residential Wiring Situations. Video, Voice and Data Wiring Installation. Lighting Fixture Installation. Device Installation. Service Panel Trim-Out. Checking Out and Troubleshooting Electrical Wiring Systems. Green Wiring Practices. Alternative Energy System Installation.

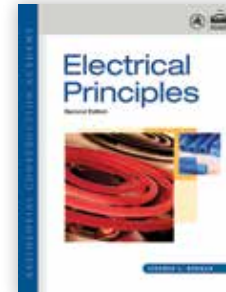
SUPPLEMENTS

Workbook/Lab Manual ISBN: 9781337404518
Instructor's Guide ISBN: 9781337404495
MindTap with full, interactive ebook, videos, assignments, and Delmar Online Training Simulations ISBN: 9781337902632



RCA

Additional Titles and Supplements:



Electrical Principles, 2E
ISBN: 9781111306472
Stephen L. Herman, ©2012

CONTENTS

Safety. Basic Electrical Theory. Electrical Quantities and Ohm's Law. Resistors. Series Circuits. Parallel Circuits. Combination Circuits. Measuring Instruments. Using Wire Tables and Determining Conductor Sizes. Magnetic

Induction. Alternating Current. Inductance in Alternating Current Circuits. Resistive-Inductive Series Circuits. Resistive-Inductive Parallel Circuits. Capacitors. Single-Phase Transformers. Single-Phase Motors.

SUPPLEMENTS

Workbook/Lab Manual ISBN: 9781111306502
Instructor's Guide ISBN: 9781111306489



Plumbing, 2E
ISBN: 9781111307776
Michael Joyce, ©2012

CONTENTS

Introduction to the Plumbing Profession. Plumbing Safety. Plumbing Tools. Introduction to Plumbing Math. Introduction to Plumbing Drawings. Plastic Pipe and Fittings. Copper Pipe and Fittings. Cast-Iron Pipe and Fittings. Carbon

Steel Pipe and Fittings. Corrugated Stainless Steel Tubing. Fixtures and Faucets. Introduction to Drain, Waste, and Vent (DWV) Systems. Introduction to Water Distribution Systems.

SUPPLEMENTS

Workbook/Lab Manual ISBN: 9781111307806
Instructor's Guide ISBN: 9781111307783



HVAC, 2E
ISBN: 9781439056349
Eugene Silberstein, ©2012

CONTENTS

Matter, Energy and Heat Basics. The Refrigeration Process. General Safety Practices. Refrigerant Management. Hand Tools. Tubing and Piping Tools. Specialized HVAC/R Tools. Location. Duct Systems. System Connections. Leak Testing. System

Evacuation. System Start-up and Charging. Electric Fundamentals. Electric Motors. Electric Controls. Wiring Diagrams. Electric Codes. Testing and Balancing. Indoor Air Quality. Mechanical Troubleshooting. Electrical Troubleshooting. Electric Heat. Gas Heat. Oil Heat. Hydronic Heat. Heat Pumps.

SUPPLEMENTS

Workbook/Lab Manual ISBN: 9781439056035
Instructor's Guide ISBN: 9781439056202

Additional Titles and Supplements:



SUPPLEMENT
Green Applications for Residential Construction

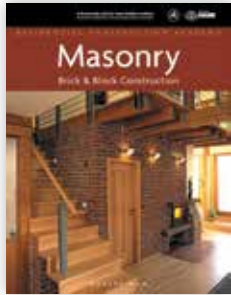
ISBN: 9781111037543

Mike Guertin, ©2011

CONTENTS

Introduction to Green Building. Application 1: Masonry. Application 2: Plumbing. Application 3: House Wiring. Application

4: HVAC. Application 5: Carpentry. Application 6: Facilities Maintenance.



Masonry: Brick & Block Construction

ISBN: 9781418052843

Robert Ham, ©2008

CONTENTS

Brick Positions and Sizes. Brick Bonds and Patterns. Masonry Hand Tools. Masonry Construction Equipment. Laying Brick to the Line. Constructing Brick Leads. Masonry

Spacing Scales. Masonry Mortars. Concrete Masonry Units. Laying Block to the Line. Constructing Block Leads. Estimating Masonry Materials. Residential Footings and Foundations. Constructing Water-Resistant Walls. Brick Veneer Construction. Composite and Cavity Walls. Brick Paving. Steps, Stoops, and Porches. Piers, Columns, Pilasters, and Chases. Appliance Chimneys. Masonry Fireplaces. Brick Masonry Arches. Cleaning Brick and Concrete Masonry. Safety for Masons. Reading Drawings and Plans.

SUPPLEMENTS

Workbook ISBN: 9781428323667

Instructor's Guide ISBN: 9781418052850



Facilities Maintenance, 3E

ISBN: 9781133282433

Kevin Standiford, ©2014

CONTENTS

Customer Service Skills. Methods of Organizing, Trouble-shooting, and Problem Solving. Applied Safety Rules. Fasteners, Tools, and Equipment. Practical Electrical Theory. Electrical Facilities Maintenance. Carpentry. Surface

Treatments. Plumbing. Heating, Ventilation, and Air-Conditioning Systems. Appliance Repair and Replacement. Trash Compactors. Elevators. Pest Prevention. Landscaping and Groundskeeping. Basic Math for Facilities Maintenance Technicians. Blueprint Reading for Facility Maintenance Technicians Weatherization Concepts. Weatherization Installation, Maintenance and Repair. Solar Systems, Maintenance and Repair.

SUPPLEMENTS

Workbook ISBN: 9781133282464

Instructor Resources CD ISBN: 9781133282440

Instructor's Guide ISBN: 9781133282457

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 Contact your Sales Consultant at NGL.Cengage.com/RepFinder