Preparing for Your Exam:

To prepare effectively, decide how much time you'll need. NGWA exams are designed by professionals to reflect best practices in the groundwater industry. While practical experience is essential, studying the recommended materials is key to success.

Resources referenced in the study guide available in **NGWA's Bookstore:**

- *Basic Water Systems*
- *Employee Safety Manual*
- *Engineering Your Business*
- *Groundwater & Wells, 3rd Edition – Appendices located on CD in back of book*
- *Model Environmental Health and Safety Manual*
- *Water Systems Handbook, 13th Edition*

- **Review the Exam Study Guide:** Familiarize yourself with the key topics covered in the exam. Use the content outline to assess your strengths and identify areas that need more focus.
- **Use NGWA's Recommended Study Materials:** Check out the resources available in the NGWA bookstore. This study guide outlines the materials that align with each exam section and will help deepen your knowledge.
- **Plan Your Study Time:** Break your study sessions into smaller, focused blocks for better retention.
- **Customize Your Study Method:**
    - Take notes, create flashcards, or study with a group.
    - Have someone read the material aloud while you take notes.
    - If you're a visual learner, draw diagrams or process flows.
    - For hands-on learners, discuss practical topics with coworkers or equipment manufacturers.
    - Reinforce what you've learned by explaining it to someone else.

Scheduling Your Exam:

- Schedule your exam online at https://test-takers.psiexams.com/ngwa or by calling 855-579-4642 and ask to schedule the National Groundwater Association's Water Systems Less Than 100 GPM exam.
- Frequently asked questions about the exam process may be found at Test Taker Support | Candidate FAQ.
- If you have trouble with scheduling your exam, please contact NGWA at certification@ngwa.org or 800-551-7379, ext. 1526.

Before Your Scheduled Exam:

- **Know What to Expect**: Boost your confidence by familiarizing yourself with the exam process. Review the test center's requirements and policies, which are outlined in NGWA's Candidate Information Bulletin.

- **Arrive Early:** Plan your route to the test center in advance and be sure to allow extra time for any unforeseen circumstances.
- **Rest Well:** Aim for a full night's sleep before the exam. Avoid cramming, as staying up late can negatively affect your performance.
- **Check-In Requirements:** You will need to present a valid, government-issued ID when checking in at the test center.
- **Leave Personal Items Behind:** Personal belongings are not permitted in the test center. Please store them securely before entering.
- **Closed-Book Exam:** No outside materials are allowed, so be sure to leave any study aids behind.
- **Eat Light:** Have a nutritious, light meal before your exam.
- **Stay Positive**: Set realistic expectations for yourself. While it's great to aim for a perfect score, missing a few questions is completely normal-and won't affect your ability to pass.
- **Manage Anxiety:** If you start to feel nervous, take a few deep breaths and consciously relax the tension in your neck and shoulders. Keeping calm will help you focus.

After Your Exam:

- You will receive your score report before leaving the test center. If you didn't pass, check the "scores by section" area below your pass/fail result. These sections align with the categories listed on this study guide. Use this information to guide your studying for the next exam attempt.
- Keep a notebook in your car to jot down any content areas or questions you found challenging. Then, refer to the exam study guide to find relevant study materials and review those topics to strengthen your understanding.

NGWA Study Materials Listed by General Drilling Exam Category

Determine Customer Needs (6 questions)

- *Water Systems Handbook, 13th Edition*
  - Book VIII, Sizing, Chapter 1 – Sizing and Selection
  - Book V Water Quality Assurance, Chapter 1 – Water Contaminants; Chapter 6 – Water System Disinfection and Water Testing; Glossary
  - Book VI Electrical Safety, Controls, & Regulators, Chapter 4 – Constant Pressure Systems
  - Appendix – Metric Standards Table
- *Groundwater & Wells, Third Edition*
  - Chapter 5 – Groundwater Chemistry

- Chapter 13 – Well Blockage and Rehabilitation
- Appendix 12.C – Cornell Pump Hydraulics Workbook
- Appendix 12.C – Goulds Technical Guide

- *Engineering Your Business*
  - Chapter 4 – Fundamentals of Water Chemistry II
  - Chapter 15 – Control Valves vs VFDs II
- *Basic Water Systems*
  - Chapter 14 – Deep Well Jet Pumps

Assess Job Site (6 questions)

- *Groundwater & Wells, Third Edition*
  - Chapter 8 – Drilling Fluids
  - Appendix 12.C – Cornell Pump Hydraulics Workbook
- *Engineering Your Business*
  - Chapter 2 – Using and Understanding Pump Curves II
- *Basic Water Systems*
  - Chapter 2 – Water System Terminology
- *Employee Safety Manual*
- *Model Environmental Health and Safety Manual*
  - Confined Space Operations Policy
  - Hazard Communication Program

Determine System Component Requirements (9 questions)

- *Water Systems Handbook, 13th Edition*
  - Book I Well Fundamentals, Chapter 2 – Private Water System Fundamentals
  - Book II Pumps, Chapter 1 – Jet Pump Operation and Installation; Chapter 2 – Submersible Pump Operation and Installation; Chapter 4 – Electric Motors; Glossary
  - Book III Services, Chapter 1 – Servicing Instruments
  - Book IV Components, Chapter 2 – Other Water System Components; Glossary
  - Book V Water Quality Assurance, Chapter 1 – Water Contaminants
  - Book VI Electrical Safety, Controls, & Regulators, Chapter 2 – Electrical Supply and Protection; Chapter 4 – Constant Pressure Systems; Appendix – Metric Standards Table
  - Book VII Community Water Systems, Shared Wells, & Groundwater Heat Pumps, Chapter 2 – Groundwater Heat Pumps
  - Book VIII: Sizing, Chapter 1 – Sizing and Selection

- *Groundwater & Wells, Third Edition (Appendix located on CD)*
  - Chapter 5 – Groundwater Chemistry
  - Chapter 6 – Aquifer-Test Data Collection and Analysis
  - Chapter 10 – Water-Well Construction and Abandonment
  - Chapter 12 – Groundwater Pumps
  - Appendix 12.A – Common Groundwater Well Pumps and Pump-System Components
  - Appendix 12.C – Cornell Pump Hydraulics Workbook
  - Appendix 12.C – Goulds Technical Guide
  - Appendix 12.E – Goulds VLT Installation Manual
  - Appendix 12.E – Peerless VLT Troubleshooting Guide
  - Appendix 12.G – Franklin Electric AIM
- *Engineering Your Business*
  - Chapter 1 – Using and Understanding Pump Curves I
  - Chapter 4 – Fundamentals of Water Chemistry II
  - Chapter 5 – Electrical Theory I
  - Chapter 6 – Electrical Theory II
  - Chapter 7 – Electrical Theory III
  - Chapter 8 – Let's Talk Efficiency
  - Chapter 10 – Large Submersible Pump System Design
  - Chapter 12 – Vertical Turbine Pump Basics II
  - Chapter 14 – Control Valves vs VFDs I
  - Chapter 22 – Peripheral Systems I
  - Chapter 31 – Codes: What are They Good For?
- *Basic Water Systems*
  - Chapter 2 – Basic Water System Terminology
  - Chapter 3 – Basic Pump Hydraulics
  - Chapter 6 – Calculating Pipe Friction Loss
  - Chapter 9 – Calculating Total Dynamic Head
  - Chapter 13 – Shallow Well Jet Pumps
  - Chapter 15 – Submersible Pumps
- *Employee Safety Manual*

Prepare to Install Pump System (5 questions)

- *Water Systems Handbook, 13th Edition*
  - Book II Pumps: Chapter 2 – Submersible Pump Operation and Installation
  - Book VI Electrical Safety, Controls, & Regulators: Chapter 1 – Electrical Safety on the Job
  - Book VIII: Sizing: Chapter 1 – Sizing and Selection
- *Groundwater & Wells, Third Edition (Appendix located on CD)*
  - Appendix 12.D – Cornell Install Manual
  - Appendix 12.E – Goulds VLT Installation Manual
  - Appendix 12.G – Franklin Electric AIM
- *Engineering Your Business*
  - Chapter 25 – Chlorination: Water Well Applications
  - Chapter 32 – Dealing with Government Contracts I
- *Basic Water Systems*
  - Chapter 4 – Effects of Atmospheric Pressure and Vacuum
- *Employee Safety Manual*
- *Model Environmental Health and Safety Manual†*
  - Injury and Illness Prevention Program

Install Pump System (16 questions)

- *Water Systems Handbook, 13th Edition*
  - Book II Pumps: Chapter 1 – Jet Pump Operation and Installation; Chapter 2 – Submersible Pump Operation and Installation; Appendix – Three-Phase Unbalance Requirements
  - Book IV Components: Chapter 2 – Other Water System Components
  - Book V Water Quality Assurance: Chapter 6 – Water System Disinfection and Water Testing
  - Book VIII: Sizing: Chapter 1 – Sizing and Selection
- *Groundwater & Wells, Third Edition (Appendix located on CD)*
  - Chapter 12 – Groundwater Pumps
  - Chapter 13 – Well Blockage and Rehabilitation
  - Appendix 12.A – Common Groundwater Well Pumps and Pump-System Components
  - Appendix 12.C – Goulds Technical Guide
  - Appendix 12.E – Johnston Troubleshooting Guide
  - Appendix 12.G – Franklin Electric AIM
- *Engineering Your Business*
  - Chapter 7 – Electrical Theory III
  - Chapter 9 – Selecting the Best Pump

- Chapter 10 – Large Submersible Pump System Design
- Chapter 12 – Vertical Turbine Pump Basics II
- Chapter 16 – Well Grouting: An Engineer's Perspective
- Chapter 24 – Chlorination: Is It Really That Important?
- Chapter 25 – Chlorination: Water Well Applications Chapter 32 – Dealing with Government Contracts I

- *Basic Water Systems*
  - Chapter 2 – Water System Terminology
  - Chapter 3 – Basic Pump Hydraulics
  - Chapter 6 – Calculating Pipe Friction Loss
  - Chapter 14 – Deep Well Jet Pumps
- *Model Environmental Health and Safety Manual†*
  - Hazard Communication Program

Troubleshoot Existing Pump System (8 questions)

- *Water Systems Handbook, 13th Edition*
  - Book I Well Fundamentals: Chapter 2 – Private Water System Fundamentals
  - Book II Pumps: Chapter 2 – Submersible Pump Operation and Installation; Appendix – Three-Phase Unbalance Requirements
  - Book III Services: Chapter 3 – Submersible Pump Service
  - Book IV Components: Chapter 1 – Pressure Tanks
  - Book V Water Quality Assurance: Chapter 1 – Water Contaminants
  - Book VIII: Sizing: Chapter 1 – Sizing and Selection
- *Groundwater & Wells, Third Edition (Appendix located on CD)*
  - Chapter 5 – Groundwater Chemistry
  - Chapter 12 – Groundwater Pumps
  - Appendix 12.A – Common Groundwater Well Pumps and Pump-System Components
  - Appendix 12.C –Cornell Pump Hydraulics Workbook
  - Appendix 12.C – Goulds Technical Guide
  - Appendix 12.G – Franklin Electric AIM
- *Engineering Your Business*
  - Chapter 1 – Using and Understanding Pump Curves I
  - Chapter 2 – Using and Understanding Pump Curves II
  - Chapter 10 – Large Submersible Pump System Design
  - Chapter 13 – Vertical Turbine Pump Basics III
  - Chapter 14 – Control Valves vs VFDs I
  - Chapter 15 – Control Valves vs VFDs II
  - Chapter 21 – Electrical Systems

- *Basic Water Systems*
  - Chapter 6 – Calculating Pipe Friction Loss
  - Chapter 9 – Calculating Total Dynamic Head
  - Chapter 10 – Understanding and Preventing Cavitation
- *Model Environmental Health and Safety Manual†*
  - Code of Safe Work Practices