

# How Water Works

ILLUSTRATED PROCESSES, EQUIPMENT, AND TECHNOLOGY

## Inside a Well-Equipped Water Treatment Lab

**R**eliable and standardized laboratory analyses form the basis for water quality control and public health protection. Water treatment plant and distribution system operators will find the equipment pictured here in many water quality laboratories.

1. Jar-testing equipment for conducting miniature experiments in water treatment plants guides chemical selection and dosage.
2. Water taps continuously run in a long sink to bring in water from different processes of the plant for testing.
3. Bunsen-type burners perform ordinary heating procedures, such as sterilization.
4. An ammonia probe determines ammonia concentration and is used by utilities that apply ammonia during treatment to form chloramine.
5. A turbidimeter measures the loss in intensity of a light beam through a solution that correlates to suspended particulate matter in water.
6. A fluoride probe measures fluoride content in water, either naturally occurring or added during treatment.
7. A pH meter measures the hydrogen-ion activity in water to determine if the water is acidic or basic.
8. Microscopes yield information from samples on plant and animal life presence in source water, such as algae, protozoa, and crustaceans.

9. A fume hood minimizes exposure to laboratory employees by containing and removing hazardous fumes and chemicals as procedures are performed.
10. Eyewash and shower stations are accessible for personal safety in case corrosive chemicals spill on a laboratory analyst.
11. A dishwasher keeps glassware clean.

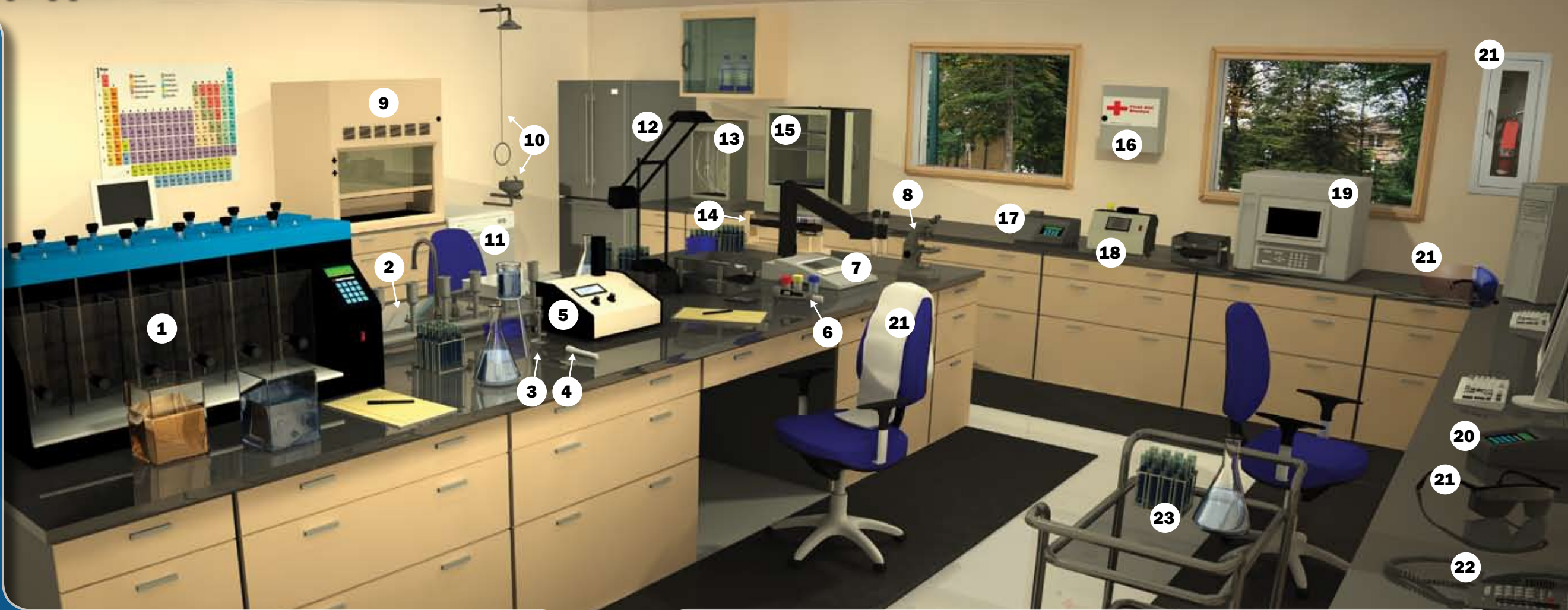
12. A refrigerator keeps samples cold and preserved until they can be analyzed and is used to store quality-assurance standards.
13. Reagent-grade water is prepared by distillation, deionization, or reverse osmosis.
14. Beam and electronic balancing equipment are certified for measuring chemicals and solids in making standards used for quality assurance.

15. Ovens prepare glassware to be clean and free of organic contamination.
16. First-aid equipment is readily available if minor medical attention is required.
17. A spectrophotometer measures a water sample's absorption of light to determine the level of certain types of organic matter in the water.
18. A chlorine analyzer determines residual chlorine levels in water samples.

19. A total organic carbon analyzer measures disinfection by-product precursors to track their removal during treatment.
20. A colorimeter measures the intensity of a water sample's color caused by organic or inorganic constituents.
21. Personal protective equipment and supplies provide for personal safety and include safety glasses, gloves, lab coats, a face shield, and a fire extinguisher.

22. A phone is needed for contact with treatment and distribution system operators and customer service.
23. Glassware used in the laboratory should be heat-resistant, borosilicate, class A glassware.

**Editor's Note:** For more information on laboratory procedures for water supply practices, see *M12, Simplified Procedures for Water Examination*, and *Safety First: Laboratory Safety for Water Professionals* (DVD), available from the AWWA Bookstore ([www.awwa.org/bookstore](http://www.awwa.org/bookstore)).



Some illustration elements exaggerated for emphasis.

ILLUSTRATION: RON KNOWLTON