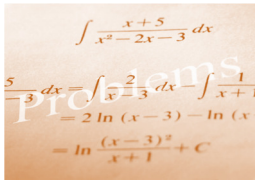
What qualities do you need to learn to be successful in chemistry-related professions?

Some technical skills and knowledge are obtained directly through exercises in chemistry coursework and laboratories or on-the-job experiences.

OBSERVATION SKILLS. Technicians and scientists must carefully **monitor experiments and processes, keeping complete records** of conditions, procedures, and results. Clinicians and medical scientists conduct experiments that require precise observation of samples and other health data. Mistakes could lead to inconclusive or misleading results.

ANALYTICAL SKILLS. Chemists perform scientific studies. You must be both **precise and accurate** in analyses – errors can and often do invalidate the entire work.

DATA ANALYSIS AND MATH SKILLS. **Synthesizing the results** of experiments and **interpreting them** mathematically to determine trends is fundamental to any scientist's job. Researchers regularly use complex equations and formulas. A **broad understanding of mathematics** is needed**, including calculus and algebra**. Some chemistry specialties (physical or computational chemistry, for example) may require more complex mathematical approaches. Many health, biological, or environmentally-related professions also use statistics to properly quantify and analyze research questions.



ABILITY TO USE TECHNOLOGY. Successful scientists must be able to **set up, adjust, and operate sophisticated equipment** to ensure that processes run efficiently, properly, and safely.

Some qualities are gained by practice over multiple science courses and experiences. These skills are achieved by applying learned knowledge to new scenarios and "thinking outside the box". A chemistry degree allows you the opportunity to practice these.

CRITICAL-THINKING SKILLS. Practicing scientists, technicians, and clinicians must carefully **evaluate their own work** as well as the work of others to determine if results and conclusions are based on sound science.

PROBLEM-SOLVING AND DECISION-MAKING SKILLS. Chemists, biochemists, and medical scientists **research and develop new and improved chemical products, processes, and materials**. Even health-care professionals must analyze complex problems in order to find solutions or treatments. In all cases, you must use your expertise to determine what questions are relevant to ask, how best to investigate the problem, and what data will best answer the questions.

Some qualities are less knowledge-based, but are achieved with practice and dedication.

ORGANIZATIONAL SKILLS. Science professionals need to **carefully document processes** to conform to regulations and industry procedures. Disorganization in the workplace can lead to legal problems, damage to equipment, chemical spills, and other problems.

TIME-MANAGEMENT SKILLS. Technicians often work on **multiple tasks** and projects simultaneously and must **prioritize** assignments.

COMMUNICATION SKILLS. Whether in industry, academic, or governmental employment fields, communicating with team members, other scientists, and non-scientific colleagues is essential. You must **be able to read and write technical and lay reports, give presentations, explain conclusions, and publish research**, depending on the level of the job. Medical scientists are often required to write grant proposals to continue their research.

INTERPERSONAL SKILLS. In today's workplaces, scientists, technicians, health-care workers, and managers typically work on **research teams and need to work well with others** toward a common goal. Many of those with advanced degrees serve as team leaders and must be able to motivate and direct other team members.

PERSEVERANCE. Anyone in a chemistry-related profession must be thorough in their approach to problems. Scientific research involves **substantial trial and error**, especially in applied fields. It takes personal dedication and motivation to succeed.

University of Tennessee at Chattanooga Chemistry Department, SRW rev. 5/2014. Skills are derived from occupational data of professions requiring a chemistry degree, Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2014-15 Edition, on the Internet at http://www.bls.gov/ooh/.