



Chemical Educators

... Have a challenging and rewarding job

Chemical educators at every level from middle schools to colleges and universities emphasize that, contrary to the widespread misconception, teaching is not a cushy job. It often requires hard work for modest pay—but it can also be extremely rewarding. Educators find it tremendously inspiring to help students grow, develop, and seek their potential.

Some chemistry professors see teaching as a way to pursue a lifelong love of the discipline, continually working close to the frontiers of chemistry. They are involved in conducting either original research or hands-on practice and application of chemistry with their students on a daily basis.

For other chemical educators, the desire to teach may come first. One educator says that she always knew she wanted to be a teacher but decided to major in chemistry only after falling in love with it during her high school years. Now a high school teacher herself, she enjoys helping students understand and explain the way the world works using chemistry.

... Guide and shape young lives

Next to parents, educators have the greatest influence on a young person's development. They act not only as teachers but also as role models and mentors.

Chemical educators—whether in colleges, high schools, middle schools, community colleges, or graduate schools—say the aspect of their work that satisfies them the most is helping shape the lives and minds of students. It is the reason they have chosen teaching as the career in which to practice their knowledge and skills as chemists.

... Work differently at various levels

Given the fact that responsibilities vary at different types of educational institutions, it is important to select a position with demands that match your interests.

Those who enjoy teaching high school chemistry say that they like working with adolescents, who possess maturity but also have an innocence about them. Those who teach undergraduate and graduate students say they appreciate the attributes they commonly find in these

older students. While graduate students can be as emotional as 18-year-olds leaving home for the first time, they have different goals—and often are eager to change the world. However, their need for guidance and support can be as great as the high school or college student's.

At the postsecondary level, various types of educational institutions emphasize different aspects of chemistry—teaching, learning, and research. Some universities expect faculty to focus on research and publish in scholarly journals, for instance, while others emphasize teaching. To accommodate students with relatively diverse backgrounds, faculty at community colleges often teach a range of introductory and remedial courses.

Educators teach problem-solving skills, stimulate creativity, provide challenges, and offer support. Teachers have different personalities, interests, and styles of teaching—but a love of chemistry and an interest in working with young people are two common denominators for chemical educators. Individual teachers may be drawn to the level at which they teach by a real affinity for that particular age group.

... Master their fields

Those interested in teaching chemistry are advised to observe classes—not only advanced classes but also classes where the students are not as motivated. Ask yourself if you can relate to the way these students learn. You must be prepared to work with students who have little interest in the material as well as those who bring natural zeal to their studies.

The best preparation for a teaching career is to master your field of interest. You must have a deep knowledge of the relevant subject area to be a good teacher. However, successful chemical educators say that two other crucial factors also contribute to being a good educator: You must have the *ability* to share your knowledge, and you must have the *desire* to share your knowledge. An interest in chemistry will not necessarily make you a good chemistry teacher if you don't have the skills and drive to share information with someone else.



American Chemical Society, Education and International Activities Division,
1155 Sixteenth Street, NW, Washington, DC 20036; 800-227-5558; chemistry.org
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Originally produced with funding from the Alfred P. Sloan Foundation as part of its Science Career Cornerstone Series.

FACT FILE: Chemical Educators

WORK DESCRIPTION ► Chemical educators give lectures, conduct discussions, and organize and supervise labs. They lead field trips, prepare classes, facilitate group work by students, grade papers, and meet with students and parents outside class. At colleges and universities, educators spend time reviewing professional journals and keeping up to date with developments in the field. Many carry out independent research, publish work regularly, write textbooks, develop lab experiments, and work with students on research projects. At many colleges and nearly all universities, faculty members also dedicate time to applying for funding to support research.

WORKING CONDITIONS ► High school chemistry teachers may teach approximately six classes of 15 to 30 students. At universities, lectures for introductory chemistry courses are large—up to 400 students—but advanced courses and research supervision entail the same personal contact found in smaller classes. Research universities often have high-quality equipment and can offer students and teachers excellent lab experience.

PLACES OF EMPLOYMENT ► Chemical educators are employed mostly by state or local education systems and, to a lesser extent, by private institutions. They are employed in middle and high schools, two-year colleges, liberal arts and other four-year colleges, and M.S. and Ph.D. granting institutions. They rarely practice at the elementary school level.

PERSONAL CHARACTERISTICS ► Educators agree that it is important to feel enthusiastic about their subject and truly interested in their students. They must have a firm grasp of their material and the ability to make abstract principles concrete. Educators must also be caring; willing to go the extra mile for students; and not frustrated by disciplinary problems, students' lack of understanding, or failure to turn in work on time. A good gauge of your ability to teach will come through tutoring students and testing your ability and patience while helping them.

EDUCATION AND TRAINING ► It is recommended that high school teachers have a bachelor's degree in chemistry and take courses in other sciences, math, and education. Most states have certification requirements. Two-year colleges usually require their instructors to have a master's degree, if not a doctorate. Chemistry faculty at four-year colleges and universities as well as M.S. and Ph.D.-granting institutions hold doctorates and often have post-doctoral experience.

JOB OUTLOOK ► The job market for chemistry faculty is tough. At the college level, up to 100 qualified applicants can vie for a single teaching position. Competition for high school positions is generally less intense. In some parts of the country, there is a severe shortage of qualified science teachers. A starting high school teacher may be asked to teach some related courses, depending on the size of the school.

SALARY RANGE ► Starting salaries for B.S.-level graduates teaching high school average in the high \$20,000s or low \$30,000s. M.S. degree holders start at about \$30,000. A high school chemistry teacher with 10 years of experience and a B.S. or M.S. degree may earn in the mid-\$30,000s. Some high school chemistry instructors with Ph.D.s tend to be older, but they earn the same salary as their counterparts with M.S. degrees.

Most college and university chemical educators hold doctorates. Salaries generally rise with rank and differ according to length of contract, work function, and type of institution. Public and private institutions have similar pay scales. One large difference in academic pay arises from length of contract; the longer the contract, the higher the salary. Academics doing research at a Ph.D.-granting institution tend to earn the highest salaries. They are more apt to supplement their salaries by consulting than chemists in any other type of employment. Chemists who teach as their primary function in industry tend to hold Ph.D.s and are few in number.

FOR MORE INFORMATION

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WHAT YOU CAN DO NOW ► Exposure to working faculty members is a good way to begin understanding their jobs and determine whether teaching is right for you. In college you may be able to get a job as a lab assistant or a teaching assistant or get involved in tutoring programs. Some colleges offer tutoring to local high school students. Working with students in this way may help you discover talents you didn't know you had. On the other hand, you may discover that you don't enjoy explaining and describing things to students of a particular age and education level.