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# Jobs for Which You Probably Will Need A College Education



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# Jobs for Which You Probably Will Need A College Education

Are you exploring careers that require a college education and perhaps even more advanced training in graduate or professional school? If so, this pamphlet can be of help to you. Even if you have not chosen a career but are planning to go to college, you can use the information it contains.

This pamphlet presents a list of occupations—selected from the 1980-81 *Occupational Outlook Handbook* of the Bureau of Labor Statistics—for which you'll probably need a college education. It highlights the training requirements for each. Included are the familiar occupations that require at least a bachelor's degree, such as teacher and engineer, and those that require professional training beyond college, such as lawyer and physician. There also are occupations you might not have thought about, such as credit manager, securities sales worker, occupational safety and health worker, and technical writer. In addition, this pamphlet includes several occupations for which a college degree is not generally required but for which a degree is becoming more important. Examples are airplane pilot, hotel manager, and wholesale trade sales worker.

These summaries cannot provide all the information you need, however. Details on the content of a degree program are omitted. So too is information on special talents, aptitudes, or interests a job may require. For more information about an occupation, look in the *Occupational Outlook Handbook*. It describes the nature of the work, working conditions, places of employment, job qualifications and advancement prospects, employment outlook, and earnings for hundreds of occupations. It also lists related occupations and other helpful sources of career information.

The *Handbook* is available in offices of school guidance counselors and employment counselors and in school and public libraries. Or it may be purchased for \$8 by check or money order from the nearest regional office of the Bureau of Labor Statistics. A list of offices and their addresses appears at the back of this pamphlet.

Reprints from the *Handbook* also are available, each containing information about several related occupations. At the end of this pamphlet is a list of reprints along with an order form that includes information on prices.

This pamphlet is one in a series of five prepared by the Bureau of Labor Statistics. Each pamphlet discusses a group of occupations for which a particular educational or training background is applicable. The other titles in the series are: *Jobs for Which You Can Train Through Apprenticeship*; *Jobs for Which You Can Qualify If You're Not a High School Graduate*; *Jobs for Which You Can Qualify If You're a High School Graduate*; and *Jobs for Which You Probably Will Need Some College or Specialized Training*.

## Office Occupations

### Computer and Related Occupations

*Programmers.* There are no universal training requirements for programmers because employers' needs vary. Most programmers are college graduates; others have taken courses in programming to supplement their experience. Firms that use computers for scientific or engineering applications usually require programmers to have a bachelor's degree with a major in the physical sciences, mathematics, engineering, or computer science. Some of these jobs require a graduate degree. Although some employers who use computers for business applications do not require a college degree, they prefer applicants who have had courses in data processing, accounting, and business administration.

*Systems analysts.* Generally, a bachelor's degree is the minimum educational requirement. For a job with a bank, insurance company, or other business firm, a college degree in accounting, business, or economics is appropriate. For work in a scientific or technical organization, applicants need a degree in the physical sciences, mathematics, or engineering. In addition to the bachelor's degree in a suitable field, some employers prefer applicants who have related work experience. Others require a graduate degree. A growing number of employers seek applicants who have a degree in computer science, information systems, information science, or data processing. Regardless of college major, most employers look for people who are familiar with programming languages. In addition,

most employers prefer applicants who have some experience in computer programming.

### **Banking Occupations**

*Bank officers and managers.* Management trainees generally fill these positions although outstanding bank clerks or tellers may be promoted to trainee positions and then to management jobs. A bachelor's degree is the minimum educational requirement for management trainees. A major in banking and finance is useful, but liberal arts graduates who have had courses in accounting, economics, and statistics also are well qualified. Some banks prefer to hire persons who have a graduate degree for trainee positions; the most desirable degree is the Master of Business Administration.

### **Insurance Occupations**

*Actuaries.* A bachelor's degree with a major in mathematics or statistics provides a good background for a beginning job in a large life or casualty company; a degree in actuarial science is even better. Some companies hire applicants who have an economics or business administration major, if they have a thorough foundation in calculus, probability, and statistics. Other useful courses are insurance, law, economics, and accounting. Completion of the entire series of examinations for full professional status usually takes from 5 to 10 years. Applicants who pass the first two examinations while still in college usually have an advantage in competing for actuarial jobs upon graduation.

*Claim representatives.* A growing number of insurance companies prefer to hire college graduates for positions as claim representatives (examiners and adjusters). College training is not always necessary, however. Persons experienced in automobile repair work might be hired as auto adjusters, and those who have had clerical experience might get jobs as inside adjusters. About three-fourths of the States require adjusters to be licensed. State licensing requirements vary, but applicants usually must complete an approved course in insurance or loss adjusting, and pass a written examination. They should be bonded which requires good character references and should be at least 20 years old.

*Underwriters.* A bachelor's degree is the minimum educational requirement for beginning underwriting jobs. Applicants who have a degree in business administration or liberal arts are preferred, but college training in almost any field is acceptable. Some companies train high school graduates who have experience as underwriting clerks to become underwriters.



### **Administrative and Related Occupations**

*Accountants.* Most large firms require applicants to have a bachelor's degree with a major in accounting. Some prefer applicants who have a master's degree in accounting. Training in accounting also is available in junior and community colleges, business schools, and correspondence schools; however, job opportunities for graduates of these 1- and 2-year programs usually are limited to small accounting and business firms. A growing number of employers prefer applicants who are familiar with computers. To become a certified public accountant (CPA), each State requires that an individual pass an examination prepared by the American Institute of Certified Public Accountants, and meet the education and experience requirements of the State. Other designations indicating professional competence include certified internal auditor (CIA) and certified management accountant (CMA).

*Buyers.* Many buyers have worked their way up from stockroom and sales positions. Nevertheless, a college degree is increasingly important for buyers, and may be required in the future. Generally, employers train graduates from any field. Many stores have formal 6- to 8-month programs for all management trainees, including buyers. These programs combine classroom instruction in merchandising and purchasing with short rotations to various jobs and departments in the store.

*City managers.* Although some individuals who have a bachelor's degree in public administration may find employment as a city manager, a master's degree in public or business administration is becoming essential. Workers usually begin as a management assistant in a position such as administrative assistant, department head assistant, or assistant city manager and advance to more responsible positions or to a city manager job as they gain experience.

*College student personnel workers.* A bachelor's degree generally is required for personnel workers; an advanced degree is necessary for higher level positions. Schools often prefer persons who have a bachelor's degree in social science and a master's degree in student personnel work. Some personnel occupations may require specialized training. A college counselor, for example, may need a master's degree in clinical or counseling psychology. A Ph. D. usually is required for top student personnel positions.

*Credit managers.* A bachelor's degree usually is required for beginning jobs in credit management. Employers generally prefer applicants who have majored in business administration, economics, or accounting, although some employers hire liberal arts graduates as well. Experience may substitute for the college degree; some employers accept high school graduates who have had experience in credit collection or in processing credit information.

*Hotel managers and assistants.* Although experience and management ability are most important in selecting hotel managers, employers increasingly prefer applicants who have completed a 4-year college curriculum in hotel and restaurant administration. Formal training in hotel or restaurant management also provides opportunities for part-time or summer job experience and contacts with prospective employers. Employers may hire graduates of the hotel training programs offered by some junior colleges, technical institutes, and the Educational Institute of the American Hotel and Motel Association. Some large hotels have special management trainee programs in which newly hired workers or persons promoted from within rotate among various departments to acquire a thorough knowledge of the hotel's operation.

*Lawyers.* All States require admission to the bar to practice law. To qualify for the bar examination, applicants generally must complete 4 years of college followed by 3 years of law school. Four years of study usually are required to complete a night school law curriculum. Although formal training takes place in law school, careful selection of undergraduate courses is important because there is no "prelaw major." Students

should choose courses that develop and expand their reading, writing, verbal, and analytical skills. College majors in the social sciences, natural sciences, or humanities are particularly suitable. Competition for admission to law school is intense. As is true for other professional schools, law schools vary widely in quality and reputation. Graduates will find their standing in the graduating class and the stature of the school they attended important to prospective employers.

*Marketing research workers.* Although a bachelor's degree usually is sufficient for trainees, graduate education is necessary for many specialized market research positions. Experience in other types of research can qualify workers; teachers of marketing or statistics, for example, may be hired to head a marketing research department. Graduate study usually is required for advancement, and a sizable number of market researchers hold a master's degree in business administration.

*Personnel and labor relations workers.* A bachelor's degree is the minimum educational background for a beginning job in personnel work—a field that includes occupations such as recruiter, interviewer, job analyst, position classifier, wage administrator, training specialist, and employee counselor. Some employers look for college graduates who have majored in personnel administration, public administration, business, or economics, while others prefer applicants who have a liberal arts background. Graduate study in industrial relations, economics, business, or law usually is required for a labor relations job. The combination of a law degree plus a master's in industrial relations is increasingly desirable for people seeking to enter this small and highly competitive field. Some workers gain experience in personnel work and then switch to labor relations.

*Purchasing agents.* A college degree is required for a beginning position with a large company. Many companies hire business administration or liberal arts majors as trainees, but firms that manufacture machinery or chemicals generally prefer science or engineering majors. Large companies increasingly look for applicants who have a master's degree in business administration or management. Some small firms select purchasing agents from their own staff and do not require a college degree. Continuing education is essential for career advancement. Purchasing agents are encouraged to participate in professional seminars and to take college and university courses in purchasing.

*Urban and regional planners.* The master's degree in planning is the usual requirement for entry level jobs. A



bachelor's degree in city planning, architecture, landscape architecture, engineering, or other closely related field is acceptable for some beginning jobs. A master's degree is essential for advancement in most jobs.

## Service Occupations

### Protective and Related Service Occupations

*FBI special agents.* An applicant usually must graduate from a State-accredited law school or have a major in accounting. As the need arises, the FBI occasionally recruits college graduates who have a physical science major, fluency in a foreign language, or 3 years of professional investigative experience. Applicants must be a U.S. citizen between 23 and 35 years of age. They must meet rigid physical requirements and pass an aptitude test.

*Health and regulatory inspectors (government).* Because inspectors perform a wide range of duties, qualifications for employment vary. The Federal Government requires a passing score on the Professional and Administrative Career Examination (PACE) for many occupations, including immigration, customs, occupational safety, and health and consumer safety inspectors. To take the examination, a bachelor's degree or 3 years of responsible work experience is re-

quired. Other Federal inspectors must pass an examination based on specialized knowledge, in addition to having work experience in a related field. Qualifications for inspectors at the State and local level usually are similar to those for Federal employees. All inspectors complete classroom and on-the-job training.

*Occupational safety and health workers.* Entry level occupational safety and health professionals generally need at least a bachelor's degree in engineering or science. Many employers prefer applicants who have a graduate degree in industrial hygiene, safety engineering, or occupational safety and health, or prior industrial experience. Some employers will hire graduates of 2-year colleges for jobs as technicians, particularly if they have work experience related to the job.

## Education and Related Occupations

### Teaching Occupations

*Kindergarten and elementary school teachers.* All States require teachers in public elementary schools and some States also require elementary teachers in private and parochial schools to be certified. An individual must have a bachelor's degree from an institution with a State-approved teacher education program, student-teaching, and basic education courses for certification. In 1978, 23 States required teachers to have a graduate degree and 30 States required continuing education. Some States require U.S. citizenship, some an oath of allegiance, and several a health certificate. Local school systems sometimes have additional requirements.

*Secondary school teachers.* All States require public secondary school teachers to be certified, and some States also require secondary teachers in private and parochial schools to be certified. An individual must have a bachelor's degree from an institution with a State-approved teacher education program, student-teaching, and basic education courses to be certified. In 1978, 23 States required teachers to have a graduate degree and 30 States required continuing education. Some States demand U.S. citizenship, some an oath of allegiance, and several a health certificate. Local school systems sometimes have additional requirements.

*College and university faculty.* Community and junior colleges and some 4-year colleges require beginning instructors to have a master's degree. Some colleges and universities require a doctoral degree for entry level appointments and for tenure, which is increasingly difficult to attain. Advancement to assistant professor, to associate professor, and then to professor requires

additional teaching experience. Publications that evidence expertise in one's discipline are also helpful.

### **Library Occupations**

*Librarians.* A master's degree in library science generally is required to enter the occupation. A Ph. D. degree is an asset for individuals who plan a teaching career or who aspire to a top administrative post, particularly in a college or university library, or in a large library system. Information scientists and special librarians generally need a master's degree or doctorate in the subject area of the specialized library. Most States require public school librarians to be certified both as teachers and as librarians. Some States require certification of public librarians; the specific education and experience necessary vary.

### **Sales Occupations**

*Insurance agents and brokers.* Many employers prefer college graduates when hiring new insurance sales workers. Degrees in almost any field are acceptable, but applicants who have studied accounting, economics, finance, business law, or insurance are preferred. Because success in selling greatly depends on personal qualities such as aggressiveness and self-confidence, employers look for these traits. Some employers hire individuals who have experience and these characteristics, whether or not they have attended college. Newly hired workers usually receive some formal training. Trainees may attend company-sponsored classes or courses at local colleges and universities. Home study (correspondence) courses also are available. All agents and most brokers must be licensed in the State where they sell insurance. Most States require candidates for a license to pass a written examination.

*Manufacturers' sales workers.* Employers generally prefer to hire college graduates for these positions. A bachelor's degree in liberal arts or in business administration is good preparation for selling nontechnical products. Industrial manufacturers look for applicants who have degrees in science or engineering, and pharmaceutical companies usually prefer persons who have studied pharmacy. Newly hired sales workers may receive specialized training before they start on the job. Some companies, especially those that manufacture complex technical products, have formal training programs that last 2 years or longer. Other firms offer classroom instruction followed by additional training under the supervision of field managers.

*Securities sales workers.* Employers generally prefer to hire college graduates and consider a degree in business administration, economics, finance, or liberal arts good preparation for the job. Successful sales or

managerial experience is particularly helpful. Almost all States require securities sales workers to be licensed and bonded and to pass a written test. In addition, practically all sales workers must be a registered representative of their firm according to the regulations of the securities exchanges through which they do business, or the National Association of Securities Dealers. Examinations and character investigations are required for registration. Most employers provide training to help newly hired sales workers meet the requirements for registration.

*Wholesale trade sales workers.* Employers generally require applicants to be high school graduates, although college training is increasingly important. The background a sales worker needs depends mainly upon the product line and the market. Selling certain products, such as pharmaceuticals, may require a background in chemistry, biology, or pharmacy, for example. High school graduates may begin in a non-selling job and work their way up or may be hired as a sales trainee. Usually it takes 2 years or longer to prepare trainees for sales positions. College graduates enter the sales force directly out of school.

### **Occupations in Transportation Activities**

#### **Air Transportation Occupations**

*Airplane pilots.* Pilots who are paid to transport passengers or cargo must have at least a commercial pilot's license from the Federal Aviation Administration (FAA). To obtain a license, applicants must be at least 18, have at least 250 hours of flight experience, and pass a strict physical examination. Applicants also must pass a written test and demonstrate their flying ability to FAA examiners. For bad weather, pilots also must be licensed to fly by instruments which requires 40 hours of experience using instruments, passing a written test, and demonstrating their ability to FAA examiners. New pilots, usually hired as flight engineers, already have fulfilled the added requirements. Airline captains must have a transport pilot's license requiring even more flight experience. Flying can be learned in military or civilian flying schools, but the airlines and many businesses prefer pilots trained in the Armed Forces. Airline pilots must be high school graduates; however, most airlines require 2 years of college and prefer college graduates.

#### **Merchant Marine Occupations**

*Merchant marine officers.* Candidates must either acquire at least 3 years of appropriate sea experience or graduate from the U.S. Merchant Marine Academy, from one of six State merchant marine academies, or from a trade union training program. Candidates also must pass a Coast Guard examination to obtain a

license. Usually, applicants who have sea experience but are not graduates of academies must obtain training to pass the examination.

## Scientific and Technical Occupations

### Conservation Occupations

*Foresters.* A bachelor's degree with a major in forestry generally is required to become a forester. Because of the large supply of forestry graduates, however, many employers prefer applicants who have an advanced degree. Teaching and research generally require the advanced degree.

*Range managers.* A bachelor's degree with a major in range management, range science, or a closely related field usually is required for employment as a range manager. Many college students obtain valuable experience through summer jobs with Federal Government agencies, such as the Forest Service or Bureau of Land Management. A graduate degree in range management generally is required for teaching and research positions, and is helpful for advancement in other jobs.

*Soil conservationists.* Because few colleges and universities offer a degree in soil conservation, most soil conservationists have a degree in agronomy, agriculture, or a closely related field of natural resource science, such as wildlife biology, forestry, or range management. A background in agricultural engineering and courses in cartography are very useful.

### Engineers

*Engineers.* Most entry positions in engineering require a bachelor's degree. College graduates who have majored in mathematics or one of the natural sciences may qualify for some beginning jobs. Occasionally, experienced technicians advance to engineering jobs. However, graduate training in engineering, which is emphasized for a number of jobs, is essential for teaching and research and for advancement in many areas. In all States, engineers must be registered if they offer their services directly to the public, or if their work affects life, health, or property. The majority of engineers are not registered. Registration requirements include a degree from an accredited engineering school, 4 years of relevant work experience, and passing a State examination.

### Environmental Scientists

*Geologists.* A bachelor's degree in geology or a related field is appropriate training for many entry jobs. An advanced degree is helpful for promotion in most types of work and is required for college teaching and some research positions.



*Geophysicists.* A bachelor's degree in geophysics or a geophysical specialty, or in a related field of science or engineering with courses in geophysics, physics, geology, mathematics, chemistry, and engineering generally is the minimum requirement for these positions. Graduate training usually is necessary for jobs in research and college and university teaching, and for supervisory positions in exploration activities.

*Meteorologists.* Generally, the minimum requirement is a bachelor's degree in meteorology, or in a related science or engineering with courses in meteorology. An advanced degree is necessary for some positions, particularly in research and in college and university teaching.

*Oceanographers.* An advanced degree, preferably a Ph. D. degree in oceanography, one of the natural sciences, or engineering generally is required to become an oceanographer. A bachelor's degree is sufficient for a beginning job as a research or laboratory assistant.

### Life Science Occupations

*Biochemists.* Many beginning jobs in biochemistry, especially in research and teaching, require an advanced degree. A Ph. D. degree usually is necessary for high-level biochemical research and for advancement

to managerial and administrative jobs. A bachelor's degree with a major in biochemistry or chemistry, or with a major in biology and a minor in chemistry, may be sufficient for an entry job as a research assistant or technician.

*Life scientists.* This group includes scientists such as botanists, zoologists, microbiologists, and agronomists. Although a bachelor's degree is adequate for some jobs in these fields, most positions require graduate training. A Ph. D. degree usually is required to teach in a college or university, or to obtain a senior research or administrative position. A professional health degree, such as an M.D. or D.D.S., is necessary for some jobs in medical research.

*Soil scientists.* A bachelor's degree in soil science, agronomy, or a closely related field usually is required. Some employers also require applicants to have had courses in chemistry and cartography. Soil scientists who have training in both field work and laboratory work may have the edge in obtaining the best jobs. An advanced degree, especially a doctorate, may be necessary for high-level research jobs. A few States require certification of soil scientists who inspect soil conditions before construction starts. To be certified, applicants must have a bachelor's degree and 3 years' experience as a soil scientist or a master's degree and 2 years' experience. Applicants must pass a written examination.

### **Mathematics Occupations**

*Mathematicians.* Although a bachelor's degree in mathematics is adequate for some jobs in private industry and government, employers usually require an advanced degree. A Ph. D. degree generally is required to teach in a college or university. In applied mathematics, training in the field in which the mathematics will be used is important.

*Statisticians.* A statistician generally must have a bachelor's degree in statistics or mathematics. For some jobs, however, a bachelor's degree in economics or another applied field and a minor in statistics is preferable. An advanced degree is required for some positions, particularly college teaching. Courses in computer programming, systems analysis, and other computer-related subjects are highly recommended.

### **Physical Scientists**

*Astronomers.* The usual requirement for a job in astronomy is a Ph. D. degree. Persons who have less education may qualify for some jobs; however, high-level positions in teaching and research as well as advancement in most areas are open only to those who have a doctorate. In addition to students with a bachelor's degree in astronomy, those with a bachelor's

degree in physics or in mathematics with a physics minor usually can qualify for graduate programs in astronomy.

*Chemists.* A bachelor's degree in chemistry usually is the minimum requirement for entry positions in analysis and testing, quality control, technical service and sales, or jobs as assistants to senior chemists in research and development laboratories. Graduate training is essential for many positions, and is helpful for advancement in all types of work. A Ph. D. degree generally is required for teaching in colleges and universities and for advancement to many administrative positions.

*Physicists.* A bachelor's degree is adequate for some entry level jobs, but graduate training in physics or a related science is needed for advancement. A doctorate usually is required for teaching positions in colleges and universities, and for senior research and administrative positions.

### **Other Scientific and Technical Occupations**

*Food technologists.* A bachelor's degree with a major in food technology or in one of the physical or life sciences, such as chemistry or biology, is the usual minimum requirement for entry jobs. An advanced degree is necessary for many jobs, particularly research and college teaching and for some management level jobs in industry.

## **Health Occupations**

### **Dental Occupations**

*Dentists.* All States require dentists to have a license. To be licensed, candidates must graduate from a dental school approved by the American Dental Association and pass a State board examination. Most States' licenses permit dentists to engage in both general and specialized practice. However, 14 States require specialists to have 2 or 3 years of graduate education and in some cases, pass a State examination on the specialty. Dental school training generally lasts 4 academic years, although some institutions condense this training into 3 calendar years. Applicants to dental school must have 2 to 4 years of college education, including courses in the sciences and humanities. In 1978, about 4 out of 5 students in dental school had a bachelor's or master's degree.

### **Medical Practitioners**

*Chiropractors.* All States require chiropractors to meet certain educational requirements and to pass a State board examination for a license. Although the type of chiropractic procedures permitted and education re-

quired vary, most States require graduation from a 4-year chiropractic course following 2 years of undergraduate college work.

*Optometrists.* All States require optometrists to be licensed. Applicants for a license must have a Doctor of Optometry degree from an accredited school of optometry and pass a State board examination. The Doctor of Optometry degree requires a minimum of 6 years of education after high school, consisting of 4 years of optometry school preceded by at least 2 years of undergraduate college study.

*Physicians and osteopathic physicians.* All States require a license for the practice of medicine. Applicants for a license must graduate from an approved medical school or school of osteopathy, pass a State board examination, and, in almost all cases, serve a 1- or 2-year hospital residency. Most students who enter medical school or a school of osteopathy have earned a bachelor's degree, although many schools accept students who have had just 3 years of college. No one college major is best. A major in one of the sciences, or a major in the humanities with extra course work in the sciences, is good preparation. Most medical schools and schools of osteopathy have a 4-year curriculum. Persons who wish to specialize must complete "advanced residency training" usually followed by 2 or more years of practice in the specialty before they may take the specialty board examinations.

*Podiatrists.* All States require a license for the practice of podiatry. Applicants for a license must graduate from an accredited 4-year program in a college of podiatric medicine and pass a State board examination. Four States also require a 1-year residency. At least 3 years of college are required for admission to a college of podiatric medicine. Most successful applicants to schools of podiatry in 1978 had a bachelor's degree. No one college major is required.

*Veterinarians.* All States require a license to practice veterinary medicine. To be licensed, a candidate must earn the Doctor of Veterinary Medicine (D.V.M.) degree and pass a State board examination. Four years of study in a college of veterinary medicine preceded by at least 2 years of undergraduate education in the physical and biological sciences are required to earn the D.V.M. degree. Most students, however, have completed 3 to 4 years of college.

### **Medical Technologist, Technician, and Assistant Occupations**

*Medical laboratory workers.* Medical laboratory assistants usually are trained on the job. In recent years, however, an increasing number have completed 1-year

training programs at a hospital, junior college, or vocational school. Many of these schools also offer a 2-year training program for technicians. Some workers are trained in the Armed Forces. Most technologists have completed 4 years of college, including 12 months in medical technology.

### **Nursing Occupations**

*Registered nurses.* All States require professional nurses to be licensed. Applicants for a license must graduate from a school approved by the State board of nursing and pass the State board examination. All nursing schools require a high school diploma for entry. Programs vary in length from 2 to 5 years. Nurses who complete 2-year courses earn associate degrees; those who complete 3-year courses earn diplomas; and those who graduate from 4- or 5-year courses receive bachelor's degrees. A master's degree is preferred for research, consultation, teaching, administration, and clinical specialization.

### **Therapy and Rehabilitation Occupations**

*Occupational therapists.* A bachelor's degree in occupational therapy generally is required to enter this profession. Some schools, however, offer programs leading to a certificate or a master's degree in occupational therapy for students who have a bachelor's degree in another field.

*Physical therapists.* All States require physical therapists to be licensed. Applicants for a license must have a bachelor's degree in physical therapy and pass a State board examination. Persons who have a bachelor's degree in another field may enter certificate programs and master's degree programs. A graduate degree combined with clinical experience increases advancement opportunities, especially in teaching, research, and administration.

*Speech pathologists and audiologists.* Many States and Federal programs require applicants for beginning jobs to have a master's degree. In addition, a teacher's certificate often is required for work in public schools and some States insist that workers who deal with handicapped children have special training. Thirty States require that those offering speech pathology and audiology services outside of schools be licensed.

### **Other Health Occupations**

*Dietitians.* A bachelor's degree, preferably with a home economics major in foods and nutrition or institution management, is the basic educational requirement. To qualify for professional recognition, the American Dietetic Association recommends completion of a 6- to 12-month approved dietetic internship or a 1- to 2-year approved individual traineeship program after graduation.



*Health services administrators.* A bachelor's degree often is the minimum requirement but a master's degree in hospital or health administration or in public health sometimes is required. The Ph. D. degree generally is required for teaching and research and for administrative jobs in large, prestigious organizations.

*Medical record administrators.* Colleges and universities offer 4-year programs leading to a bachelor's degree in medical record administration. Some persons transfer into these programs from a junior college. One-year certificate programs are available for persons who already have a bachelor's degree and the required courses in the liberal arts and biological sciences.

*Pharmacists.* All States require pharmacists to be licensed. To obtain a license, one must graduate from an accredited pharmacy college, pass a State board examination, and usually have a specified amount of practical experience or period of internship under the supervision of a licensed pharmacist. For entry to a college of pharmacy, at least 1 or 2 years of prepharmacy education in an accredited junior college, college, or university usually are required. At least 5 years of study beyond high school are required to graduate from a college of pharmacy. Most graduates receive a Bachelor of Science (B.S.) or Bachelor of Pharmacy (B.Pharm.) degree. Many colleges of pharmacy also

offer advanced professional degree programs leading to a Doctor of Pharmacy (Pharm.D.) degree. The Pharm.D., a master's degree, or Ph. D. degree in pharmacy is required for certain research, administrative, or teaching positions.

## Social Scientists

*Anthropologists.* A Ph. D. degree in anthropology is necessary for a permanent position in colleges and universities and for many nonacademic jobs. A master's degree is sufficient for a teaching job in community and junior colleges and some 4-year colleges and for some beginning jobs in business and government, but advancement generally is limited.

*Economists.* A bachelor's degree in economics is sufficient preparation for many beginning jobs in government and industry. A master's degree is sufficient for a teaching position in community and junior colleges and some 4-year colleges and may be required for more responsible nonacademic positions. A Ph. D. degree is required for a permanent position in colleges and universities and is an asset for advancement in all areas.

*Geographers.* A bachelor's degree in geography is the minimum requirement for beginning jobs in government and industry. A master's degree, which is sufficient for a teaching job in community and junior colleges and some 4-year colleges, may be required for advancement in nonacademic areas. A Ph. D. degree is necessary for a permanent position in colleges and universities, and for some senior-level research, planning, and administrative positions.

*Historians.* Graduate education usually is necessary for employment as a historian. Although a master's degree is sufficient for a teaching job in community and junior colleges and some 4-year colleges and for some nonacademic positions, advancement may be limited for persons who do not have a Ph. D. degree. A Ph. D. is required for a permanent position in colleges and universities and for many research and administrative jobs.

*Political scientists.* Graduate training generally is required for employment as a political scientist. A Ph. D. degree is necessary for a permanent position in colleges and universities and for some nonacademic jobs. A master's degree is sufficient for a teaching job in community and junior colleges and some 4-year colleges and for various administrative and research jobs in government, industry, consulting firms, and nonprofit research or civic organizations.

*Psychologists.* A doctoral degree in psychology generally is the minimum requirement for employment as a psychologist. It is needed for many beginning positions and is increasingly important for advancement, particularly in colleges and universities. The Ph. D. degree culminates in a dissertation, whereas the Psy. D. (Doctor of Psychology) is based on practical work and examinations. Master's degree holders may teach in community and junior colleges and some 4-year colleges, work as school psychologists or counselors, or serve as psychological assistants. Bachelor's degree holders may assist psychologists in a variety of settings. All States and the District of Columbia have certification or licensing requirements for psychologists who want to enter independent practice. The requirements generally include a doctorate in psychology, 2 years of professional experience, and successful completion of a written examination. Some States certify master's degree holders as psychological assistants or associates.

*Sociologists.* A master's degree in sociology generally is the minimum requirement for employment as a sociologist. Although a master's degree is sufficient for a teaching job in community and junior colleges and some 4-year colleges and for some nonacademic positions, advancement opportunities may be limited. A Ph. D. degree is necessary for a permanent position in colleges and universities and commonly is needed for jobs as directors of major research projects, administrators, or consultants.

## Social Service Occupations

### Counseling Occupations

*School counselors.* Most States require school counselors to have both counseling and teaching certificates, although an increasing number of States no longer require teaching certification. To obtain a teaching certificate, an individual must have a bachelor's degree from an institution with a State-approved teacher education program, including basic education courses and student teaching. Depending on the State, graduate work and from 1- to 5-years of teaching experience usually are required for a counseling certificate. Most undergraduate students interested in becoming school counselors take the regular program of teacher education with additional courses in psychology and sociology. In States that do not require teaching experience, students can major in any field. A few States substitute a counseling internship for teaching experience. One to two years of study are necessary to earn a master's degree in counseling.

*Employment counselors.* Although minimum entrance requirements currently are not uniform among private,



community, and State employment service agencies, many employers prefer a master's degree in counseling. Some others require only a high school diploma and some counseling-related experience. College students should enroll in courses in psychology and sociology. The master's degree requires from 1 to 2 years of study including supervised counseling experience. After beginning work, counselors usually continue training at area colleges and universities or at in-service programs scheduled by counseling agencies.

*Rehabilitation counselors.* A bachelor's degree with courses in counseling, psychology, and related fields is the minimum requirement. However, employers prefer persons who have a master's degree in rehabilitation counseling, vocational counseling, or a related area. Rehabilitation counselors in many States must be hired according to State civil service and merit system rules. These regulations usually require applicants to pass a competitive examination, sometimes supplemented by an interview, and evaluation by a board of examiners. In addition, some private organizations require counselors to pass an examination given by the Commission on Rehabilitation Counselor Certification.

*College career planning and placement counselors.* A master's degree in counseling, college student person-

nel work, or a behavioral science is preferred. Work experience in business, industry, government, or educational organizations before entry is helpful.

### **Clergy**

*Protestant ministers.* Educational requirements vary greatly among denominations. Some have little or no requirements while others may require 3 years of professional study in an accredited school or seminary after college graduation.

*Rabbis.* Completion of a 3- to 5-year prescribed course of study in a seminary usually is required for ordination, although entrance requirements and the curriculum depend upon the branch of Judaism. Conservative and Reform seminaries require a bachelor's degree for entry, but most Orthodox seminaries have no formal requirements.

*Roman Catholic priests.* Preparation normally requires 8 years of study after high school. Generally, 4 years of training in a college or college seminary are required. After graduation, individuals complete 4 years of study in a theological seminary.

### **Other Social Service Occupations**

*Cooperative extension service workers.* These workers must have at least a bachelor's degree in the field in which they will conduct their educational program. Although one can specialize in a variety of areas, the most common are agriculture, home economics, youth activities, and community resource development. In addition, training in educational techniques and in a communications field, such as journalism, is helpful. Often workers receive instruction in pre-induction training programs and can improve their skills through regular in-service training programs.

*Social workers.* A bachelor's degree in social work generally is the minimum educational requirement for beginning jobs in the field. However, many positions, particularly supervisory, research, or administrative jobs, require a master's degree in social work. A doctorate often is preferred for teaching positions. In 1978, 22 States had licensing or registration laws for social work practice and for the use of professional social work titles. Usually, work experience, successful completion of an examination, or both are required.

## **Performing Arts, Design, and Communications Occupations**

### **Design Occupations**

*Architects.* All States require architects to be licensed (registered). To obtain a license, applicants must have

a bachelor's degree in architecture plus 3 years of experience in an architect's office, and must pass a written examination. Those who have master's degrees need only 2 years of experience. In most States, an architect may substitute 12 years of practical experience for the bachelor's degree. Many graduates of schools of architecture work in the field without a license. However, a registered architect is required to take legal responsibility for all work.

*Industrial designers.* Completion of an industrial design curriculum in an art school, an art department of a university, or a technical college is the usual way to enter this field. Persons majoring in engineering, architecture, or fine arts may qualify as industrial designers if their backgrounds match the type of work being done by their employers. Most large manufacturing firms hire only industrial designers who have a bachelor's degree in the field.

*Interior Designers.* A 3-year course in a professional school of interior design or a 4-year college or university program in interior design and decoration is increasingly necessary to enter the field. In most cases, 1 to 5 years of on-the-job training are necessary for advancement to designer.

*Landscape Architects.* A bachelor's degree in landscape architecture through a 4- to 5-year program of study is the usual requirement for employment. To qualify for a license for independent practice, which more than half of all States require, applicants must have a degree in landscape architecture from an accredited school, 2 to 4 years' experience, and the ability to pass an examination. Experience sometimes may substitute for the degree.

### **Communications Occupations**

*Newspaper reporters.* Most newspapers consider only applicants who have a bachelor's degree. They prefer a journalism major or another major combined with journalism. Graduate work is increasingly important. Rural, small-town, and suburban papers may have jobs for talented writers without a college degree, but college graduates seeking experience fill even these jobs. Intern experience or part-time work on a newspaper while in school helps immeasurably in job placement after graduation.

*Public relations workers.* A bachelor's degree in journalism, communications, or public relations usually is preferred for beginning jobs. Some employers, however, seek college graduates who have a degree in a scientific or technical field, plus communications skills. Many employers prefer to hire applicants who have media or journalism experience.



*Radio and television announcers.* This highly competitive profession is difficult to enter. Formal training in broadcasting in a college or technical school and experience working for a campus or local station are valuable. However, station officials pay particular attention to taped auditions. A Federal Communications Commission radiotelephone operator license often is helpful, since the added skill enables announcers to handle many broadcasting duties. Such versatility is particularly important in small stations, where announcers generally get their first jobs. Larger stations often require several years' experience.

*Technical writers.* Although any person who can write effectively about a technical subject may be hired as a technical writer, many employers prefer applicants who have a college degree in science or engineering plus a minor in English, journalism, or technical communication. Other employers emphasize writing ability and seek candidates who have degrees in technical communication, English, journalism, or the liberal arts. Often technical writers have worked as research or editorial assistants, technicians, scientists, or engineers before seeking technical writing jobs. Some employers, however, hire inexperienced college graduates. A portfolio of writing samples is invaluable when applying for a job. Knowledge of graphics and other aspects of publication also may help.

## Ordering Occupational Outlook Handbook Reprints

There are 42 reprints from the *Occupational Outlook Handbook*, 1980-81 Edition, available for order. Each reprint contains a group of related occupational and industrial statements. For example, reprint 2075-35, Communications Occupations, includes statements on broadcast technicians, newspaper reporters, photographers, public relations workers, radio and television announcers, the radio and television broadcasting industry, and technical writers. A list of all reprints follows. A flyer that cross-references all *Occupational Outlook Handbook* occupations and industries to the reprints in which they appear may be obtained by using the reprint order form on the back page of this leaflet.

### Occupational Outlook Reprints, 1980-81 Edition

Bulletin No.	Title
2075-1	Tomorrow's Jobs
2075-2	Metalworking Occupations
2075-3	Printing and Publishing Occupations
2075-4	Factory Production Occupations
2075-5	Clerical Occupations
2075-6	Office Machine and Computer Occupations
2075-7	Banking and Insurance Occupations
2075-8	Business Occupations
2075-9	Service Occupations
2075-10	Food Merchandising Occupations
2075-11	Protective and Related Service Occupations
2075-12	Education and Related Occupations
2075-13	Sales Occupations
2075-14	Construction Occupations — Structural
2075-15	Construction Occupations — Finishing
2075-16	Air and Water Transportation Occupations
2075-17	Railroad Occupations
2075-18	Driving Occupations
2075-19	Environmental Scientists and Conservation Occupations
2075-20	Engineering and Related Occupations
2075-21	Physical and Life Scientists
2075-22	Mathematics and Related Occupations
2075-23	Public Utilities Occupations
2075-24	Motor Vehicle and Machinery Repairers

2075-25	Machine Repairers and Operators	College and university faculty . . . . .	12
2075-26	Small Business Occupations	College career planning and placement	
2075-27	Health Practitioners	counselors . . . . .	31
2075-28	Health Occupations	College student personnel workers . . . . .	31
	Dental auxiliaries, nursing,	Cooperative extension service workers . . . . .	36
	therapy and rehabilitation, health	Credit managers . . . . .	8
	services administration	Dentists . . . . .	27
2075-29	Health Occupations	Dietitians . . . . .	32
	Medical technologists, technicians,	Economists . . . . .	30
	and assistants, dispensing opti-	Elementary school teachers . . . . .	12
	cians, ophthalmic laboratory tech-	Employment counselors . . . . .	31
	nicians, medical record personnel	Engineers . . . . .	20
2075-30	Lawyers, City Managers, and Social	FBI special agents . . . . .	11
	Science Occupations	Food technologists . . . . .	21
2075-31	Counseling and Related Occupations	Foresters . . . . .	19 or 36
2075-32	Social Service Occupations	Geographers . . . . .	30
2075-33	Performing Arts and Entertainment-	Geologists . . . . .	19
	Related Occupations	Geophysicists . . . . .	19
2075-34	Design Occupations	Health and regulatory inspectors . . . . .	11
2075-35	Communications Occupations	Health services administrators . . . . .	28
2075-36	Agriculture and Logging and Lum-	Historians . . . . .	30
	ber Mill Products Industries	Hotel managers and assistants . . . . .	9
2075-37	Energy-Producing Industries	Industrial designers . . . . .	34
2075-38	Petroleum Refining, Industrial	Insurance agents and brokers . . . . .	7 or 13
	Chemical, Drug, and Paper and	Interior designers . . . . .	34
	Allied Products Industries	Kindergarten teachers . . . . .	12
2075-39	Aluminum, Iron and Steel, and	Landscape architects . . . . .	34
	Foundry Industries	Lawyers . . . . .	8 or 30
2075-40	Aircraft, Missile, and Spacecraft,	Librarians . . . . .	12
	Office Machine and Computer,	Life scientists . . . . .	21
	Electronics, and Motor Vehicle	Manufacturers' sales workers . . . . .	13
	and Equipment Manufacturing In-	Marketing research workers . . . . .	8
	dustries	Mathematicians . . . . .	22
2075-41	Apparel, Baking, Laundry and Dry	Medical laboratory workers . . . . .	29
	Cleaning, and Textile Mill Prod-	Medical record administrators . . . . .	29
	ucts Industries	Merchant marine officers . . . . .	16
2075-42	Government Occupations	Meteorologists . . . . .	19

The following is an alphabetical listing of the occupations included in this leaflet. Occupations are cross-referenced to the *Handbook* reprint in which they appear.

Accountants . . . . .	8 or 22	Personnel and labor relations workers . . . . .	8
Actuaries . . . . .	7 or 22	Pharmacists . . . . .	27
Airplane pilots . . . . .	16	Physical therapists . . . . .	28
Anthropologists . . . . .	30	Physicians . . . . .	27
Architects . . . . .	34	Physicists . . . . .	21
Astronomers . . . . .	21	Podiatrists . . . . .	27
Bank officers and managers . . . . .	7	Political scientists . . . . .	30
Biochemists . . . . .	21	Programmers . . . . .	6 or 22
Buyers . . . . .	13	Protestant ministers . . . . .	31
Chemists . . . . .	21	Psychologists . . . . .	30 or 31
Chiropractors . . . . .	27	Public relations workers . . . . .	8 or 35
City managers . . . . .	30	Purchasing agents . . . . .	8
Claim representatives . . . . .	7	Rabbis . . . . .	31

Radio and television announcers .....	33 or 35	Soil conservationists .....	19 or 36
Range managers .....	19 or 36	Soil scientists .....	21
Registered nurses .....	28	Speech pathologists and audiologists .....	28
Rehabilitation counselors .....	31	Statisticians .....	22
Roman Catholic priests .....	31	Systems analysts .....	6 or 22
School counselors .....	31	Technical writers .....	3 or 35
Secondary school teachers .....	12	Underwriters .....	7
Securities sales workers .....	13	Urban and regional planners .....	34
Social workers .....	32	Veterinarians .....	27
Sociologists .....	30	Wholesale trade sales workers .....	13

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