

CAREER GUIDE FOR SOIL SCIENTIST

SOC Code: 19-1013.02

Pay Band(s): 4, 5 and 6 ([Salary Structure](#))

Standard Occupational Description: Research or study soil characteristics, map soil types, and investigate responses of soils to known management practices to determine use capabilities of soils and effects of alternative practices on soil productivity.

Soil Scientist positions in the Commonwealth are assigned to the following Roles in the [Life and Physical Science Career Group](#):

[Scientist I](#)

[Scientist II](#)

[Scientist III](#)

While Soil Scientists within the Commonwealth are all located within the Life and Physical Science Career Group, individuals may want to pursue other opportunities within the Commonwealth depending upon individual training, education, knowledge, skills, abilities, and interests.

Other Career Group(s) that may be of interest are:

[Agricultural Services](#)

[Natural Resources](#)

[Laboratory and Research Technicians and Specialists](#)

[Environmental Services](#)

SKILLS, KNOWLEDGE, ABILITIES AND TASKS

(Technical and Functional Expertise)

Skills

Note: *The technical and functional skills listed below are based on general occupational qualifications for Soil Scientists commonly recognized by most employers. Typically, you will not be required to have all of the skills listed to be a successful performer. Recruitment and selection standards for an individual state job must be based on the specific knowledge, skills, and abilities for that job as indicated in the job announcement and job description in the Employee Work Profile.*

1. Using scientific rules and methods to solve problems.
2. Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.
3. Understanding written sentences and paragraphs in work related documents.
4. Talking to others to convey information effectively.
5. Conducting tests and inspections of products, services, or processes to evaluate quality or performance.
6. Using mathematics to solve problems.
7. Analyzing needs and product requirements to create a design.
8. Understanding the implications of new information for both current and future problem-solving and decision-making.

9. Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.
10. Communicating effectively in writing as appropriate for the needs of the audience.

Knowledge

Note: *The technical and functional knowledge statements listed below are based on general occupational qualifications for Soil Scientist commonly recognized by most employers. Typically, you will not be required to have all of the knowledge listed to be a successful performer. Recruitment and selection standards for an individual state job must be based on the specific knowledge, skills, and abilities for that job as indicated in the job announcement and job description in the Employee Work Profile.*

The Knowledge of:

1. Chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.
2. Plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.
3. Techniques and equipment for planting, growing, and harvesting food products (both plant and animal) for consumption, including storage/handling techniques.
4. Arithmetic, algebra, geometry, calculus, statistics, and their applications.
5. Structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

Abilities

Note: *The technical and functional abilities listed below are based on general occupational qualifications for Soil Scientists commonly recognized by most employers. Typically, you will not be required to have all of the abilities listed to be a successful performer. Recruitment and selection standards for an individual state job must be based on the specific knowledge, skills, and abilities for that job as indicated in the job announcement and job description in the Employee Work Profile.*

The Ability to:

1. Apply general rules to specific problems to produce answers that make sense.
2. Combine pieces of information to form general rules or conclusions (includes finding a relationship among seemingly unrelated events).
3. Read and understand information and ideas presented in writing.
4. Generate or use different sets of rules for combining or grouping things in different ways.
5. Choose the right mathematical methods or formulas to solve a problem.
6. Listen to and understand information and ideas presented through spoken words and sentences.
7. Speak clearly so others can understand you.
8. Communicate information and ideas in speaking so others will understand.
9. Come up with a number of ideas about a topic (the number of ideas is important, not their quality, correctness, or creativity).
10. Add, subtract, multiply, or divide quickly and correctly.

Tasks

Note: *The following is a list of sample tasks typically performed by Soil Scientists. Employees in this occupation will not necessarily perform all of the tasks listed.*

Tasks

1. Studies soil characteristics and classifies soils according to standard types.
2. Provides advice on rural or urban land use.

3. Performs chemical analysis on micro-organism content of soil to determine microbial reactions and chemical mineralogical relationship to plant growth.
4. Investigates responses of specific soil types to soil management practices, such as fertilization, crop rotation, and industrial waste control.
5. Conducts experiments on farms or experimental stations to determine best soil types for different plants.

INTERESTED?

Like people, occupations have traits or characteristics. These characteristics give important clues about the nature of the work and work environment, and give you an opportunity to match your own personal interests to a specific occupation. When you choose a job in an occupation that matches your own interests you have taken an important step in planning a successful and rewarding career.

The occupation of Plant Scientist has **Investigative** and **Realistic** characteristics as described below:

Investigative — Investigative occupations frequently involve working with ideas, and require an extensive amount of thinking. These occupations can involve searching for facts and figuring out problems mentally.

Realistic — Realistic occupations frequently involve work activities that include practical, hands-on problems and solutions. They often deal with plants, animals, and real-world materials like wood, tools, and machinery. Many of the occupations require working outside, and do not involve a lot of paperwork or working closely with others.

LICENSURE, REGISTRATION, OR CERTIFICATION REQUIREMENTS

Generally this is not required for Soil Scientist positions in state government.

Individuals interested in becoming certified in Virginia shall meet the education, eligibility, experience and examination requirements specified in Chapter 22 of Title 54.1 of the Code of Virginia. The Department of Professional and Occupational Regulations' Board for Professional Soil Scientists and Wetland Professionals provides certification information for Soil Scientists who wish to obtain certification through this voluntary program on the Department of Professional & Occupational Regulations' web site at: <http://www.dpor.virginia.gov/>.

The American Society of Agronomy <http://www.agronomy.org/> offers certification programs in crop science, agronomy, crop advising, soil science, plant pathology, and weed science. To become certified, applicants must pass designated examinations and have at least 2 years of experience with at least a bachelor's degree in agriculture or 4 years of experience with no degree. To become a certified crop advisor, however, candidates do not need a degree.

Certification may enhance professional growth and career progression.

EDUCATIONAL, TRAINING, AND LEARNING OPPORTUNITIES

The Department of Labor provides the following information:

Soil scientists study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. They also study the responses of various soil types to fertilizers, tillage practices, and crop rotation.

Training requirements for agricultural scientists depend on their specialty and on the type of work they perform. A bachelor's degree in agricultural science is sufficient for some jobs in applied research or for assisting in basic research, but a master's or doctoral degree is required for basic research. A Ph.D. in agricultural science usually is needed for college teaching and for advancement to administrative research positions.

The State Council of Higher Education lists Virginia Tech as a Virginia educational institution offering a program in crop and soil environmental science.

COMMONWEALTH COMPETENCIES

Competencies are a set of identified behaviors, knowledge, skills, and abilities that directly and positively impact the success of employees and the organization. Competencies can be observed and measured. When consistently demonstrated, competencies make employees particularly effective in their work. Competencies help lay out a road map to career success. You can use the Commonwealth Competencies to help improve your individual performance by adopting behaviors that make high performing employees successful in their jobs. In this way, you can use the Commonwealth Competencies for your further professional development.

The Commonwealth Competencies are:

1. Technical and Functional Expertise
2. Understanding the Business
3. Achieving Results
4. Serving the Customer
5. Teamwork
6. Interpersonal and Communication Skills
7. Leadership and Personal Effectiveness

The above competencies may be applied to employees throughout the Commonwealth of Virginia. They can be rank-ordered by agencies and hiring managers to represent the needs of a specific job. The rank ordering will change depending upon the occupation, an organization's priorities, the actual job requirements, and the supervisor's preferences.

Career success is both about what you do (applying your technical knowledge, skills, and ability) and how you do it (the consistent behaviors you demonstrate and choose to use) while interacting and communicating with others. Hopefully, by studying the Commonwealth competencies, identifying your developmental opportunities, and working to refine your own competence, you can take charge of your career!

For additional information about the **Commonwealth Competencies** go to:

http://jobs.state.va.us/cc_planningctr.htm. For the competencies, we first list the competencies

and then define each. Finally, we list competency indicators; to describe what successful performance looks like.

COMMONWEALTH CAREER PATH

Career opportunities in the Commonwealth are not limited to moving “up” to the next highest role and pay band, changing positions, or to becoming a supervisor. That’s because most roles describe a broad group of occupationally related positions that perform a range of work that requires increased knowledge and skills. For that reason, Commonwealth roles describe the career paths within the same or higher-level role for the same or different Career Group. The broad salary range and the Commonwealth’s pay practices provide flexibility in recognizing career development and advancement. ([Salary Structure](#))

For example: **Soil Scientist**

PAY BAND	PRACTITIONER ROLES
4	Scientist I
5	Scientist II
6	Scientist III

PAY BAND	MANAGER ROLES
5	Scientist Manager I
6	Scientist Manager II
7	Scientist Manager III

Sample Career Path

Scientist I

This Scientist I role provides a career track for soil scientists that perform work in a laboratory, in the field, and/or for scientific research. Employees’ responsibilities range from entry-level performing standardized scientific tests and research functions using established protocols, to performing independent analysis/studies and serving as technical advisors or lead workers. Employees conduct research, field and/or technical investigations and surveys, laboratory and/or statistical analyses and data interpretation.

Scientist II

This Scientist II role provides a career track for soil scientists that perform a preponderance of advanced work and serve as an expert in a laboratory, in the field, and/or for research; or, for scientist supervisors. The first career track in this role is for employees performing complex scientific research projects or program oversight having a broad scope of responsibility. The second career track is for scientists that continue to deliver scientific services while assuming supervision of professional scientific staff and performing administrative responsibilities.

Scientist III

The Scientist III role provides career tracks for molecular biologists, toxicologist, and transportation research scientists who serve as advance-level to expert scientists in toxicology, molecular biology or transportation research (engineering, materials, maintenance, economic development, operational programs, and safety).

Scientist Manager I

The Scientist Manager I role provides career tracks for managers in a laboratory or scientific research setting. Employees plan, manage and evaluate the work of professional staff working in one or more disciplines; establish program goals; establish and monitor budgets; develop and implement technical methodologies, section objectives, policies and practices; allocate staff and resources; ensure compliance with government regulations, quality control standards and safety procedures; prepare research proposals; prepare technical reports and papers or develop grant contract proposals.

Scientist Manager II

The **Scientist Manager II** role provides career tracks for senior level to director level managers with responsibilities in a laboratory or scientific research setting. Employees have responsibility for an agency-wide laboratory operation; serve as assistant director of a statewide laboratory; or serve as a manager over multiple operations within a statewide laboratory. Some employees direct statewide scientific research operations or multidisciplinary research operations.

Scientist Manager III

The Scientist Manager III role provides career tracks for executives that serve as directors of scientific research centers responsible for diverse research programs or, for a statewide-consolidated scientific laboratory responsible for diverse testing, reporting and research programs. Employees direct statewide research programs and strategic research direction through subordinate managers. The results of which are shared statewide, nationally and/or internationally with research groups, agencies, businesses and associations. Employees may direct a statewide program that provides analytical support to local, state and federal human and animal health, law enforcement, consumer protection and environmental programs.

ADDITIONAL OCCUPATIONAL INFORMATION CAN BE FOUND AT:

O*NET (Occupational Information Network)

http://online.onetcenter.org/gen_search_page

Virginia Employment Commission

<http://www.alex.vec.state.va.us/>

Career One Stop

<http://www.careeronestop.org/>

Virginia Career Resource Network

<http://www.vacrn.net/>