

# STEM Careers Inventory

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## ADMINISTRATOR'S GUIDE

### Overview

The *STEM Careers Inventory* is designed to help people identify their career-related personality types and then use this information to explore career options in the fields of science, technology, engineering, and math (STEM). It uses the RIASEC coding system developed by John Holland and is based on an assessment researched and developed by the U.S. Department of Labor. It is designed primarily for ease of use, and it contains the latest government data drawn from the Department of Labor's O\*NET (Occupational Information Network) database.

The assessment is useful to anyone involved in career exploration, including students and youth deciding on a career or educational direction, unemployed adults identifying alternative job objectives, and individuals in career transition. Its ease of use makes it suitable for individuals with lower reading capabilities, and its brevity makes it particularly well suited to programs where time is limited. Care has been taken to make the device easy to read and simple to interpret with little or no input or guidance from the administrator. The instrument is suited for both group and individual administration.

The assessment is designed to be self-scored and self-interpreted and takes approximately 15 minutes to complete. The Occupational Exploration Worksheet in Step 4 requires additional time for researching job titles of interest.

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## Background and Development

The *STEM Careers Inventory* consists of 72 items representing work, learning, and leisure activities such as “Build kitchen cabinets” and “Play a musical instrument.” These activities are scored as either *like*, *unsure*, or *dislike*. Results are totaled in six dimensions corresponding to the six Holland personality types, as described below.

- **Realistic:** People with Realistic personalities prefer practical, hands-on problems and solutions. They like dealing with plants; animals; and real-world materials such as wood, tools, and machinery. People with Realistic personalities do not like occupations that mainly involve paperwork or working closely with others.
- **Investigative:** People with Investigative personalities enjoy thinking, analyzing, and exploring more than physical activity. They prefer to do research and figure out problems mentally rather than persuade or lead people.
- **Artistic:** People with Artistic personalities like work activities that involve creativity and that deal with forms, designs, and patterns. They appreciate self-expression in their work. They prefer settings where work can be done without following a clear set of rules.
- **Social:** People with Social personalities want to assist others and promote learning and personal development. They prefer to work more directly with people than with objects, machines, or data. They like to teach, to give advice, to help, or to otherwise be of service.
- **Enterprising:** People with Enterprising personalities enjoy starting and carrying out projects, especially business ventures. They like persuading and leading people and making decisions. They are comfortable taking risks for profit.
- **Conventional:** People with Conventional personalities like work activities that follow set procedures and routines. They prefer working with data and detail more than with ideas. They like work in which there are precise standards and guidelines to follow.

A high score indicates a good fit with that personality type and is a potential starting point for career exploration and research. The assessment lists sample STEM occupations for each of the six personality types. These job titles come from the U.S. Department of Labor's Occupational Information Network (O\*NET). The inventory also tells users where to go to get more information on STEM jobs that interest them.

### ***Relationship to Previous Instruments***

The *STEM Careers Inventory* is based on work and research done by the U.S. Department of Labor, particularly in the development of its *O\*NET Interest Profiler*, made available for the first time in 2001. Because JIST based the *STEM Careers Inventory* on the *O\*NET Interest Profiler*, much of the information the DOL provides will directly relate to the *STEM Careers Inventory* as well. The U.S. Department of Labor maintains an Internet site at [www.onetcenter.org](http://www.onetcenter.org) that provides information on its *O\*NET Interest Profiler*. Among other things, this site offers free downloadable copies of the user's guide for the *Profiler*. Following are some topics covered in the user's guide provided by the DOL that you may find relevant to the *STEM Careers Inventory*:

- Reading level and age appropriateness of items

- Procedures for interpreting the assessment
- Background information, including the theory behind work interests and the use of interests in occupational exploration
- Development of the instrument, including revision history and reliability and validity data

In 2002, JIST developed its own version of the *O\*NET Interest Profiler* in an attempt to build on the efforts of the Department of Labor and make the assessment more user-friendly. The *O\*NET Career Interests Inventory* was an adaptation of the *O\*NET Interest Profiler*. It used the *Profiler's* work activity items, scoring system, and cross-references to job titles but combined them into one instrument. Directions were simplified and additional content was added to help users further their career research. However, some users felt that the *O\*NET Career Interests Inventory*—while an improvement on the DOL's version—was too long. Therefore JIST created an assessment called the *RIASEC Inventory* to serve the needs of professionals seeking a quick but powerful personality-type assessment.

In choosing the items for the *RIASEC Inventory*, a team of experts in the fields of career counseling and career assessment development was assembled to narrow the number of items from the 180 originally included on the *O\*NET Interest Profiler* to the 72 included in the *RIASEC Inventory*. Items were screened for congruency with the Holland scales, as well as redundancy, specificity, reading level, and relevance to today's world of work. In addition, items were screened to eliminate any references to age, race, or gender. The *STEM Careers Inventory* uses the same items as the *RIASEC Inventory*.

Because they draw their items from the same item pool as the DOL's assessment, score into the same interest categories, and share the same theoretical background, the *RIASEC Inventory* and the *STEM Careers Inventory* are comparable to the DOL's assessment in terms of validity and reliability. Holland's RIASEC interest categories are widely accepted within the career counseling and development field, and they form the basis of many other popular and heavily researched career interest inventories, including the *Self-Directed Search* and the *Strong Interest Inventory*. However, the *RIASEC Inventory* and the *STEM Careers Inventory* offer considerable advantages when compared to these other career interest inventories, namely cost, time required, and ease of use.

The *STEM Careers Inventory* also offers the advantage of focusing on a subset of occupations, the STEM careers, that are especially promising in the 21st century economy and are the focus of many efforts to improve the American educational system. In addition, the *STEM Careers Inventory* matches users to green occupations, which are especially attractive to many young people.

### ***Selection of Occupations***

The occupations that are listed in Step 3 are assigned to RIASEC personality types on the basis of ratings in the O\*NET database, release 15.1. Most of them are identified as STEM occupations by the online O\*NET site. Some additional occupations are included based on these criteria:

- They require knowledge of or skill with science, technology, engineering, or math.
- They use the skill at a level requiring at least two years of postsecondary study or training.

- They may be in health care only if their primary activity is science or technology, not patient care.

In the Step 3 lists, green occupations appear in green type. The online O\*NET site again guided most decisions on which job titles to assign to this group. It should be understood that O\*NET recognizes three kinds of green occupations:

1. Green increased-demand occupations. The impact of green economy activities and technologies is an increase in the employment demand for an existing occupation. However, this impact does not entail significant changes in the work and worker requirements of the occupation. The work context may change, but the tasks themselves do not.
2. Green enhanced-skills occupations. The impact of green economy activities and technologies results in a significant change to the work and worker requirements of an existing O\*NET-SOC occupation. This impact may or may not result in an increase in employment demand for the occupation. The essential purposes of the occupation remain the same, but tasks, skills, knowledge, and external elements, such as credentials, have been altered.
3. Green new and emerging occupations. The impact of green economy activities and technologies is sufficient to create the need for unique work and worker requirements, which results in the generation of a new occupation relative to the O\*NET taxonomy. This new occupation could be entirely novel or “born” from an existing occupation.

This definition embraces a considerably broader collection of occupations than the solar panel installers, energy auditors, and other new and emerging occupations that some people think of when they hear the term *green jobs*. The taxonomy indicates that most green jobs will be in occupations that already exist.

Because of lack of space, the list of occupations in Step 3 is incomplete. The occupations that were excluded from Step 3 were those with the smallest workforces. A complete list may be found at the end of this guide.

## **Administering the *STEM Careers Inventory***

The *STEM Careers Inventory* can be used by many professionals, including counselors, instructors, trainers, and job coaches. The *STEM Careers Inventory* was designed for self-administration and interpretation. Because of its brevity and ease of use, the *STEM Careers Inventory* is well suited for a class or group setting.

The *STEM Careers Inventory* is designed so that most people can simply read the instructions and get started. Even so, you may find it helpful to review the steps involved in taking the inventory and answer any questions. Here are some points to cover:

- Give a brief overview of the inventory’s purpose: It is a tool to help people explore STEM career options based on their interests.
- Discuss the value of identifying personality types as part of the career exploration process—namely that knowing how one’s personality types apply to and are incorporated

in specific occupations can help a person focus his or her career plans or introduce occupational choices that person may not have been aware of.

- Discuss STEM careers. Explain what the acronym stands for and why these occupations will offer many fulfilling job opportunities.
- Discuss green careers. Explain that the shift to a more sustainable economy will create many jobs in new occupations and will change work tasks in existing occupations. Many jobs will focus on renewable energy, conservation, greater efficiency, and recycling.
- Emphasize that the inventory is not a test in the traditional sense and that there are no right or wrong answers.
- Explain that low scores are not bad, and high scores are not good. The scoring is simply a way to help people identify areas they want to explore in more detail.
- Inform participants in advance if you have a time limit for when they will have to stop working. Tell them what to do if they get done early. Explain to those who do not complete the inventory in the allotted time that you will make arrangements for them to complete it after the session.
- Review the basic step-by-step elements of the inventory, explaining each step and answering questions as you go.

Following are some tips for using the *STEM Careers Inventory* as part of a career exploration curriculum.

- Small group discussion: After participants finish completing the inventory and scoring their responses, you can divide the large group into small discussion groups. Give these groups a specific task. For example, ask that each person in the group tell the others his or her highest three scores, whether the scores make sense to the person, and why. Alternatively you could ask each person in the group to discuss possible STEM jobs or job tasks that might suit his or her personality type to get an even clearer understanding of what he or she wants in a career.
- Homework: You can assign one or more of the inventory's steps or activities as homework. The results or experiences can be discussed when the group meets again. For example, group members might be asked to research one or more STEM job descriptions that interest them and report back to the group what they learned. Small groups can be formed on the basis of highest interest so that group members are sharing information that is of value to other members.
- Action activities: Action activities encourage participants to use the knowledge they've gained from taking the assessment and to go out and act on it physically. For example, you can ask group members to make one or more personal contacts to learn more about an occupation, training option, educational program, or leisure activity that is a good fit for their personality type. Alternatively, ask each group member to select a particular STEM job that interests him or her and to find someone who works in this or a related job. Outside the session, group members should interview these persons about their work. They can document what they learn and share it with the group.
- Individual or cooperative presentations: Individuals or small groups can make a large-group presentation on a topic of your or their choice. For example, they might present

what they learned about a specific STEM career area, give a review of local education resources (such as career academies, if any are available in your area), explain the results of visits to local training programs, cover available financial aid, give reviews of occupational information books or Websites, or discuss other career exploration topics.

- **Field visits and guest presenters:** You can take your group to a public library and have the librarian explain the career resources that are available there, including any computerized systems or Internet resources. You can also have a vocational counselor, employer, or other person come to a session to make a presentation or to answer questions, especially about STEM careers.

As group members do research to complete the Occupational Exploration Worksheet in Step 4 of the *STEM Careers Inventory*, encourage group members to share their factual findings about occupations for which they share an interest—for example, the skill requirements or earnings of the occupation. However, make clear to them that although they may share career facts, their *evaluations* of these facts—the + or – marks that they make on the Occupational Exploration Worksheet—reflect personal values. That is, a given fact about a STEM career may be regarded as a plus by one person but a minus by another person with different needs or preferences.

## Suggestions for Additional Research

The *STEM Careers Inventory* is an ideal starting point for career exploration. Because the inventory links to occupational titles taken from the O\*NET database, people who complete the inventory can use a wide variety of career reference materials and other resources to further their exploration. Step 4, which includes the Occupational Exploration Worksheet, identifies several such resources. Here are some additional resources that may be helpful:

- *Best Jobs for the 21st Century.* This book includes lists of O\*NET jobs with high pay, numerous openings, or fast growth, plus descriptions for the O\*NET jobs on these lists.
- *50 Best Jobs for Your Personality.* This book offers job descriptions and other useful information organized by the six interest areas used in this assessment.
- mySkills myFuture. This Web site ([www.myskillsmyfuture.org](http://www.myskillsmyfuture.org)), part of the Career One-Stop group of sites, is valuable for experienced workers who are considering career change. Users enter the name of an occupation where they have experience; the site retrieves names and important facts, including job postings, for occupations with similar skill requirements.

Step 3 of the *STEM Careers Inventory* provides lists of sample occupations to match each of the six interest areas. Participants should be made aware that these lists represent only a sample of the jobs available for each cluster, and that doing more career research will lead to more job possibilities that match their interests. To aid the career exploration and research process, a more exhaustive list of occupations by RIASEC code is provided as part of this guide.

The Occupational Exploration Worksheet in Step 4 offers a very select set of criteria for comparing occupations. Once users have narrowed their choices to three or fewer occupations, you may encourage them to complete the more thorough checklist that follows. It addresses additional criteria that may help in evaluating occupations, and it

leaves room for users to fill in their own idiosyncratic criteria. Like the worksheet in Step 4, it provides blank spaces for + and – signs.

***Career Decision-Making Checklist***

<b>Feature</b>	<b>Job 1</b>	<b>Job 2</b>	<b>Job 3</b>
Skills needed	—	—	—
Work conditions	—	—	—
Earnings	—	—	—
Job outlook	—	—	—
Interesting work tasks	—	—	—
Variety	—	—	—
Stress	—	—	—
Responsibility	—	—	—
Independence	—	—	—
Work schedule	—	—	—
_____	—	—	—
_____	—	—	—
_____	—	—	—
_____	—	—	—

## Complete List of STEM Occupations in O\*NET Database

Green occupations are in green type.

RIASEC Codes	Occupation Title
R	Fishers and Related Fishing Workers
RI	Animal Breeders
RI	Automotive Master Mechanics
RI	Electronics Engineering Technicians
RI	Fish and Game Wardens
RI	Manufacturing Engineers
RI	Mechanical Engineering Technicians
RI	Transportation Engineers
RIE	Forest and Conservation Technicians
RIE	Foresters
RIE	Range Managers
RIC	Aerospace Engineering and Operations Technicians
RIC	Agricultural Technicians
RIC	Automotive Specialty Technicians
RIC	Avionics Technicians
RIC	Biological Technicians
RIC	Civil Engineers
RIC	Electrical Engineering Technicians
RIC	Electrical Engineering Technologists
RIC	Electromechanical Engineering Technologists
RIC	Electronics Engineering Technologists
RIC	Environmental Engineering Technicians
RIC	Food Science Technicians
RIC	Mechanical Engineering Technologists
RIC	Precision Agriculture Technicians
RIC	Security Management Specialists
REC	First-Line Supervisors/Managers of Agricultural Crop and Horticultural Workers
RC	Chemical Equipment Operators and Tenders
RC	Chemical Plant and System Operators
RC	Food Batchmakers
RCI	Aircraft Mechanics and Service Technicians
RCI	Civil Drafters
RCI	Civil Engineering Technicians
RCI	Electromechanical Equipment Assemblers
RCI	Forest and Conservation Workers
RCI	Nuclear Equipment Operation Technicians
RCI	Nuclear Monitoring Technicians
RCI	Transportation Vehicle, Equipment and Systems Inspectors, Except Aviation
IR	Aerospace Engineers

RIASEC Codes	Occupation Title
IR	Animal Scientists
IR	Atmospheric and Space Scientists
IR	Biochemical Engineers
IR	Biologists
IR	Biomedical Engineers
IR	Chemical Engineers
IR	Electrical Engineers
IR	Electronics Engineers, Except Computer
IR	Geoscientists, Except Hydrologists and Geographers
IR	Hydrologists
IR	Marine Engineers
IR	Materials Scientists
IR	Microbiologists
IR	Physicists
IR	Soil and Plant Scientists
IR	Zoologists and Wildlife Biologists
IRA	Marine Architects
IRA	Medical Scientists, Except Epidemiologists
IRA	Molecular and Cellular Biologists
IRS	Engineering Teachers, Postsecondary
IRS	Nuclear Medicine Technologists
IRE	Agricultural Engineers
IRE	Fire-Prevention and Protection Engineers
IRE	Materials Engineers
IRE	Mining and Geological Engineers, Including Mining Safety Engineers
IRE	Soil and Water Conservationists
IRC	Bioinformatics Technicians
IRC	Chemical Technicians
IRC	Chemists
IRC	Computer Hardware Engineers
IRC	Environmental Engineers
IRC	Environmental Science and Protection Technicians, Including Health
IRC	Environmental Scientists and Specialists, Including Health
IRC	Food Scientists and Technologists
IRC	Industrial Engineering Technicians
IRC	Mathematical Technicians
IRC	Mechanical Engineers
IRC	Mechatronics Engineers
IRC	Microsystems Engineers
IRC	Nuclear Engineers
IRC	Petroleum Engineers
IRC	Photonics Engineers
IRC	Product Safety Engineers

RIASEC Codes	Occupation Title
IRC	Validation Engineers
IAR	Astronomers
IAR	Biochemists and Biophysicists
IAR	Geneticists
IS	Epidemiologists
IS	School Psychologists
ISA	Clinical Psychologists
ISA	Neuropsychologists and Clinical Neuropsychologists
IEA	Industrial-Organizational Psychologists
IC	Biostatisticians
IC	Financial Quantitative Analysts
ICR	Geodetic Surveyors
ICR	Industrial Safety and Health Engineers
ICR	Transportation Planners
ICA	Mathematicians
ICE	Industrial Engineers
ICE	Operations Research Analysts
ARI	Architectural Drafters
ARE	Graphic Designers
AI	Architects, Except Landscape and Naval
AIR	Landscape Architects
SRA	Park Naturalists
SRE	Farm and Home Management Advisors
SI	Anthropology and Archeology Teachers, Postsecondary
SI	Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary
SI	Biological Science Teachers, Postsecondary
SI	Economics Teachers, Postsecondary
SI	Geography Teachers, Postsecondary
SI	Health Specialties Teachers, Postsecondary
SI	Physics Teachers, Postsecondary
SIR	Agricultural Sciences Teachers, Postsecondary
SIR	Chemistry Teachers, Postsecondary
SIR	Dietetic Technicians
SIR	Forestry and Conservation Science Teachers, Postsecondary
SIA	Counseling Psychologists
SIA	Environmental Science Teachers, Postsecondary
SIA	Home Economics Teachers, Postsecondary
SIA	Mathematical Science Teachers, Postsecondary
SIA	Psychology Teachers, Postsecondary
SIC	Computer Science Teachers, Postsecondary
SA	Architecture Teachers, Postsecondary
SEI	Business Teachers, Postsecondary
SEA	Political Science Teachers, Postsecondary

RIASEC Codes	Occupation Title
ER	First-Line Supervisors/Managers of Animal Husbandry and Animal Care Workers
ERI	Engineering Managers
ERC	Aquacultural Managers
ERC	Construction Managers
ERC	Crop and Livestock Managers
ERC	First-Line Supervisors/Managers of Aquacultural Workers
ERC	Nursery and Greenhouse Managers
EI	Natural Sciences Managers
EC	Financial Examiners
EC	Logistics Managers
EC	Regulatory Affairs Managers
EC	Supply Chain Managers
ECI	Computer and Information Systems Managers
ECS	Personal Financial Advisors
CR	Mapping Technicians
CI	Database Administrators
CI	Statisticians
CIR	Environmental Compliance Inspectors
CIR	Numerical Tool and Process Control Programmers
CIE	Actuaries
CIE	Financial Analysts
CE	Accountants
CE	Cost Estimators
CE	Credit Analysts
CE	Energy Auditors
CE	Investment Underwriters
CE	Medical Records and Health Information Technicians
CER	Compliance Managers
CEI	Auditors
CEI	Budget Analysts
CEI	Insurance Underwriters
CEI	Risk Management Specialists
[no data]	Biofuels Production Managers
[no data]	Biofuels/Biodiesel Technology and Product Development Managers
[no data]	Biomass Power Plant Managers
[no data]	Brownfield Redevelopment Specialists and Site Managers
[no data]	Chief Sustainability Officers
[no data]	Geothermal Production Managers
[no data]	Green Marketers
[no data]	Hydroelectric Production Managers
[no data]	Methane/Landfill Gas Collection System Operators
[no data]	Solar Energy Systems Engineers
[no data]	Solar Sales Representatives and Assessors

RIASEC Codes	Occupation Title
[no data]	Sustainability Specialists
[no data]	Water Resource Specialists
[no data]	Wind Energy Engineers
[no data]	Wind Energy Operations Managers
[no data]	Wind Energy Project Managers

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Restrictions for use: The *STEM Careers Inventory* and any other form of the *O\*NET Interest Profiler* should be used for career exploration, career planning, and vocational counseling purposes only, and no other use has been authorized or is valid. Results should not be used for employment or hiring decisions or for applicant screening for jobs or training programs. Please see the DOL's separate Special Notice: User's Agreement at <http://online.onetcenter.org> for additional details on restrictions and use. The word *O\*NET* is a trademark of the U.S. Department of Labor, Employment and Training Administration.

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