



## End of Course (EOC) Bank Blueprints

# Natural Resource Management

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**THE OHIO STATE UNIVERSITY**  
CENTER ON EDUCATION AND  
TRAINING FOR EMPLOYMENT

**Ohio** | Department  
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### About Test Blueprints

Test blueprints are created to provide guidance to Subject Matter Experts (SMEs) during the item writing phase of test development. In addition, we believe that they can assist those instructors who did not participate in item writing (and administrators) to understand the broad content of the item bank. Items are formally allocated across a course outline in a three-step process\*:

1. CETE psychometricians use a formula which assumes that all competencies within a course outline are *essential* and of equal importance to produce a suggested test blueprint for review by Ohio Department of Education program specialists and SMEs.
2. SMEs review the blueprint as a large group before item writing for a specific EOC test. There and in small groups, SMEs review the course outline and have the ability to make changes to the blueprint with a documented rationale based on their experience and expertise.
3. Any revisions during small group work must be approved by the larger panel of SMEs attending an item writing workshop, which is the last step and produces the final blueprint which is summarized in this document.



Test blueprints can provide high-level guidance to instructors on preparing students for testing. It is important to keep in mind that the blueprint is a tool that is used when developing the test item bank during initial item writing and test creation. As with all tests, the End-of-Course test forms are a sample of the item bank.

### Interpreting the Blueprints

Test blueprints display the total number of test items SMEs planned to write to a particular *outcome* (as designated in the course outline created by the Ohio Department of Education Office of Career-Technical Education or by a vendor). Blueprints describe the structure of the item bank which is the total pool of test items created. Final test forms of 40-items are created from the item bank.

\*This newer process for producing test blueprints was implemented October 1, 2015. Item banks created prior to this date were completed under a different blueprint process and therefore we are looking backward to provide the structure of the item bank. As revisions are completed for those career fields, for example Information Technology (2017-18), the blueprint process used will be the newer model.

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# Agriculture Food and Natural Resources

ODE Subject Code: 010105

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.2.	Leadership and Communications	2.22
1.4.	Knowledge Management and Information Technology	1.11
1.6.	Business Literacy	1.11
1.9.	Financial Management	2.22
1.12.	Site and Personal Safety Procedures	8.89
<b>Strand 2. Animal Science</b>		
2.3.	Care and Management	13.33
<b>Strand 3. Biotechnology</b>		
3.1.	Handling, Preparation, Storage and Disposal	3.33
3.4.	Molecular-Genetics Technology	5.56
3.6.	Culturing	3.33
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	1.11
4.3.	Engines	5.56
<b>Strand 5. Structural Engineering</b>		
5.3.	Design and Estimate	3.33
5.6.	Construction	5.56
5.10.	Joining and Cutting Metals with Heat	3.33
<b>Strand 6. Environmental Science</b>		
6.1.	Soils	11.11
6.2.	Water Quality	3.33
6.11	Habitat Management and Restoration	3.33
<b>Strand 7. Food Sciences</b>		
7.2.	Quality Assurance	3.33
7.5.	Food Product Development	3.33
<b>Strand 8. Plant Science</b>		
8.1.	Plant Nutrition	4.44
8.4.	Growth and Management	5.56
<b>Strand 9. Energy</b>		
9.1.	Energy	5.56



# Natural Resources

ODE Subject Code: 010710

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.2.	Leadership and Communications	2.13
1.3.	Business Ethics and Law	1.06
1.12.	Site and Personal Safety Procedures	5.32
<b>Strand 2. Animal Science</b>		
2.2.	Body Systems	14.89
2.3.	Care and Management	4.26
2.4.	Recognizing Diseases and Disorders	1.06
2.7.	Animal Behavior	3.19
<b>Strand 5. Structural Engineering</b>		
5.5.	Geographic Information Systems (GIS)	2.13
5.8.	Water Distribution Systems	1.06
<b>Strand 6. Environmental Science</b>		
6.1.	Soils	6.38
6.2.	Water Quality	9.57
6.3.	Air Quality	4.26
6.4.	Water Use and Management	3.19
6.5.	Potable Water Treatment	2.13
6.6.	Wastewater Operations	1.06
6.7.	Solid Waste and Renewable Resource Management	3.19
6.8.	Contaminants and Pollution Control	2.13
6.10.	Ecosystems	8.51
6.11.	Habitat Management and Restoration	6.38
<b>Strand 8. Plant Science</b>		
8.1.	Plant Nutrition	1.06
8.2.	Plant Reproduction	3.19
8.3.	Pest Management	3.19
8.4.	Growth and Management	8.51
<b>Strand 9. Energy</b>		
9.1.	Energy Sources	2.13



# Environmental Systems Management

ODE Subject Code: 010725

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.1.	Employability Skills	6.32
1.2.	Leadership and Communications	6.32
1.3.	REQUIRED Business Ethics and Law	1.05
1.4.	REQUIRED Knowledge Management and Information Technology	2.11
1.12.	Site and Personal Safety Procedures	6.32
<b>Strand 3. Biotechnology</b>		
3.8.	Research and Experiments	7.37
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	3.16
4.2.	Equipment Operations	2.11
<b>Strand 5. Structural Engineering</b>		
5.4.	Surveying and Mapping	3.16
5.5.	Geographic Information Systems (GIS)	3.16
<b>Strand 6. Environmental Science</b>		
6.1.	Soils	9.47
6.2.	Water Quality	4.21
6.3.	Air Quality	4.21
6.4.	Water Use and Management	6.32
6.5.	Potable Water Treatment	3.16
6.6.	Wastewater Operations	4.21
6.7.	Solid Waste and Renewable Resource Management	5.26
6.8.	Contaminants and Pollution Control	6.32
6.9.	Hazardous Materials and Waste Management	3.16
6.10.	Ecosystems	6.32
<b>Strand 8. Plant Science</b>		
8.3.	Pest Management	6.32



## Wildlife & Fisheries

ODE Subject Code: 010745

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.2.	Leadership and Communications	4.12
1.3.	Business Ethics and Law	2.06
1.11.	Principles of Business Economics	1.03
1.12.	Site and Personal Safety Procedures	2.06
<b>Strand 2. Animal Science</b>		
2.1.	Nutrition	4.12
2.2.	Body Systems	12.37
2.3.	Care and Management	14.43
2.4.	Recognizing Diseases and Disorders	4.12
2.5.	Animal Health	1.03
2.6.	Population Management	1.03
2.7.	Animal Behavior	5.15
<b>Strand 3. Biotechnology</b>		
3.8.	Research and Experiments	13.40
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	1.03
<b>Strand 5. Structural Engineering</b>		
5.4.	Surveying and Mapping	3.09
5.5.	Geographic Information Systems (GIS)	2.06
<b>Strand 6. Environmental Science</b>		
6.2.	Water Quality	5.15
6.10.	Ecosystems	10.31
6.11.	Habitat Management and Restoration	11.34
<b>Strand 8. Plant Science</b>		
8.4.	Growth and Management	2.06



# Oil and Gas Operations

ODE Subject Code: 010718

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.10.	Sales and Marketing	7.45
1.11.	Principles of Business Economics	5.32
1.12.	Site and Personal Safety Procedures	10.64
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	5.32
4.2.	Equipment Operations	2.13
<b>Strand 5. Structural Engineering</b>		
5.4.	Surveying and Mapping	6.38
<b>Strand 6. Environmental Science</b>		
6.1.	Soils	3.19
6.8.	Contaminants and Pollution Control	5.32
6.9.	Hazardous Materials and Waste Management	5.32
<b>Strand 9. Energy</b>		
9.1.	Energy	10.64
9.2.	Crude Oil and Natural Gas	38.30



## Bio Energy

ODE Subject Code: 010716

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.1.	Employability Skills	7.61
1.2.	Leadership and Communications	2.17
1.3.	Business Ethics and Law	5.43
1.4.	Knowledge Management and Information Technology	5.43
1.6.	Business Literacy	2.17
1.10.	Sales and Marketing	4.35
1.11.	Principles of Business Economics	4.35
1.12.	Site and Personal Safety Procedures	6.52
<b>Strand 3. Biotechnology</b>		
3.1.	Handling, Preparation, Transportation, Storage and Disposal	5.43
3.2.	Foundations of Chemistry	3.26
3.7.	Bioreactor Technologies	7.61
3.8.	Research and Experiments	4.35
<b>Strand 6. Environmental Science</b>		
6.8.	Contaminants and Pollution Control	6.52
6.9.	Hazardous Materials and Waste Management	4.35
<b>Strand 8. Plant Science</b>		
8.5.	Harvesting	1.09
8.6.	Handling and Storage	4.35
<b>Strand 9. Energy</b>		
9.1.	Energy Sources	14.13
9.3.	Biomass	10.87





# Forestry and Woodland Ecosystems

ODE Subject Code: 010730

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.1.	Employability Skills	6.17
1.2.	Leadership and Communications	9.88
1.3.	Business Ethics and Law	1.23
1.4.	Knowledge Management and Information Technology	2.47
1.6.	Business Literacy	2.47
1.10.	Sales and Marketing	6.17
1.12.	Site and Personal Safety Procedures	8.64
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	7.41
4.2.	Equipment Operations	4.94
<b>Strand 5. Structural Engineering</b>		
5.4.	Surveying and Mapping	2.47
5.5.	Geographic Information Systems (GIS)	1.23
<b>Strand 6. Environmental Science</b>		
6.1.	Soils	4.94
6.8.	Contaminants and Pollution Control	3.70
6.10.	Ecosystems	6.17
<b>Strand 8. Plant Science</b>		
8.1.	Plant Nutrition	4.94
8.2.	Plant Reproduction	2.47
8.3.	Pest Management	6.17
8.4.	Growth and Management	9.88
8.5.	Harvesting	6.17
8.6.	Handling and Storage	2.47



# Park & Recreational Management

ODE Subject Code: 010735

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.4.	Knowledge Management and Information Technology	7.14
1.6.	Business Literacy	5.71
1.8.	Operations Management	4.29
1.10.	Sales and Marketing	5.71
1.12.	Site and Personal Safety Procedures	8.57
<b>Strand 2. Animal Science</b>		
2.3.	Care and Management	2.86
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	10.00
4.2.	Equipment Operations	7.14
<b>Strand 5. Structural Engineering</b>		
5.3.	Design and Estimate	8.57
5.4.	Surveying and Mapping	7.14
5.6.	Construction	1.43
<b>Strand 6. Environmental Science</b>		
6.1.	Soils	5.71
6.8.	Contaminants and Pollution Control	4.29
6.9.	Hazardous Materials and Waste Management	2.86
6.10.	Ecosystems	12.86
6.11.	Habitat Management and Restoration	2.86
<b>Strand 7. Food Sciences</b>		
7.7.	Biosecurity	1.43
<b>Strand 8. Plant Science</b>		
8.4.	Growth and Management	1.43



# Urban Forestry

ODE Subject Code: 010740

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.1.	Employability Skills	6.19
1.2.	Leadership and Communications	5.15
1.3.	Business Ethics and Law	2.06
1.4.	Knowledge Management and Information Technology	1.03
1.6.	Business Literacy	2.06
1.8.	Operations Management	1.03
1.9.	Financial Management	1.03
1.10.	Sales and Marketing	2.06
1.12.	Site and Personal Safety Procedures	8.25
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	14.43
4.2.	Equipment Operations	5.15
<b>Strand 5. Structural Engineering</b>		
5.3.	Design and Estimate	2.06
<b>Strand 6. Environmental Science</b>		
6.1.	Soils	8.25
6.10.	Ecosystems	3.09
<b>Strand 8. Plant Science</b>		
8.1.	Plant Nutrition	7.22
8.3.	Pest Management	14.43
8.4.	Growth and Management	18.56



# Business Management for Agricultural and Environmental Systems

ODE Subject Code: 010115

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.1.	Employability Skills	12.64
1.2.	Leadership and Communications	13.79
1.3.	Business Ethics and Law	5.75
1.4.	Knowledge Management and Information Technology	4.60
1.5.	Global Environment	1.15
1.6.	Business Literacy	14.94
1.7.	Entrepreneurship/Entrepreneurs	8.05
1.8.	Operations Management	10.34
1.9.	Financial Management	17.24
1.10.	Sales and Marketing	6.90
<b>Strand 7. Food Sciences</b>		
7.7.	Biosecurity	4.60



# Solar and Wind Energy

ODE Subject Code: 010717

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.1.	Employability Skills	3.33
1.2.	Leadership and Communications	2.22
1.3.	Business Ethics and Law	3.33
1.10.	Sales and Marketing	3.33
1.11.	Principles of Business Economics	3.33
1.12.	Site and Personal Safety Procedures	4.44
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	5.56
4.2.	Equipment Operations	2.22
4.11.	Hydraulic Systems	3.33
<b>Strand 5. Structural Engineering</b>		
5.1.	Electrical Theory	6.67
5.2.	Structural Electrical Circuits	6.67
5.3.	Design and Estimate	6.67
5.4.	Surveying and Mapping	4.44
5.6.	Construction	2.22
5.7.	Brick, Block and Concrete	4.44
<b>Strand 6. Environmental Science</b>		
6.1.	Soils	5.56
6.3.	Air Quality	1.11
6.8.	Contaminants and Pollution Control	3.33
6.9.	Hazardous Materials and Waste Management	1.11
<b>Strand 9. Energy</b>		
9.1.	Energy	5.56
9.4.	Solar Energy	7.78
9.5.	Wind Energy	13.33



# Electronic & Electrical Systems

ODE Subject Code: 010215

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.1.	Employability Skills	2.86
1.2.	Leadership and Communications	3.81
1.3.	REQUIRED Business Ethics and Law	1.90
1.4.	REQUIRED Knowledge Management and Information Technology.	7.62
1.6.	REQUIRED Business Literacy	1.90
1.8.	OPTIONAL Operations Management	1.90
1.10.	OPTIONAL Sales and Marketing	1.90
1.12.	Site and Personal Safety Procedures	10.48
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	9.52
4.3.	Engines	2.86
4.6.	Ignition System	8.57
4.8.	Starting and Charging Systems	7.62
<b>Strand 5. Structural Engineering</b>		
5.1.	Electrical Theory	39.05



# Hydraulics and Pneumatics

ODE Subject Code: 010225

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.1.	Employability Skills	3.42
1.2.	Leadership and Communications	3.42
1.3.	Business Ethics and Law	3.42
1.4.	Knowledge Management and Information Technology	2.56
1.6.	Operations Management	1.71
1.8.	Operations Management	1.71
1.10.	Sales and Marketing	1.71
1.12.	Site and Personal Safety Procedures	17.09
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	9.40
4.2.	Equipment Operations	1.71
4.11.	Hydraulic Systems	47.01
4.12.	Brakes	3.42
<b>Strand 6. Environmental Science</b>		
6.8.	Contaminants and Pollution Control	1.71
6.9.	Hazardous Materials and Waste Management	1.71



# Energy Systems Management

ODE Subject Code: 010715

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.1.	Employability Skills	6.67
1.2.	Leadership and Communications	6.67
1.3.	Business Ethics and Law	1.33
1.4.	Knowledge Management and Information Technology	2.67
1.6.	Business Literacy	2.67
1.10.	Sales and Marketing	1.33
1.11.	Principles of Business Economics	4.00
1.12.	Site and Personal Safety Procedures	8.00
<b>Strand 3. Biotechnology</b>		
3.8.	Research and Experiments	1.33
<b>Strand 4. Power Systems</b>		
4.1.	Tool, Stationary and Mobile Equipment Maintenance	9.33
4.2.	Equipment Operations	4.00
<b>Strand 5. Structural Engineering</b>		
5.1.	Electrical Theory	10.67
5.2.	Structural Electrical Circuits	6.67
5.3.	Design and Estimate	8.00
5.4.	Surveying and Mapping	4.00
5.8.	Water Distribution Systems	6.67
<b>Strand 6. Environmental Science</b>		
6.10.	Ecosystems	2.67
<b>Strand 9. Energy</b>		
9.1.	Energy Source	12.00
9.2.	Crude Oil and Natural Gas	4.00
9.3.	Biomass	5.33
9.4.	Solar Energy	5.33
9.5.	Wind Energy	8.00





# Environmental Science for Agriculture and Natural Resources

ODE Subject Code: 010720

Outcome #	Outcome Name	% Items In Bank
<b>Strand 1. Business Operations/21st Century Skills</b>		
1.1.	Employability Skills	2.13
1.2.	Leadership and Communications	3.19
1.3.	Business Ethics and Law	1.06
1.11.	Principles of Business Economic	3.19
1.12.	Site and Personal Safety Procedures	2.13
<b>Strand 2. Animal Science</b>		
2.3.	Care and Management	1.06
2.4.	Recognizing Diseases and Disorders	2.13
2.6.	Population Management	1.06
<b>Strand 3. Biotechnology</b>		
3.8.	Research and Experiments	9.57
<b>Strand 6. Environmental Science</b>		
6.1.	Soils	7.45
6.2.	Water Quality	5.32
6.3.	Air Quality	3.19
6.4.	Water Use and Management	3.19
6.5.	Potable Water Treatment	2.13
6.6.	Wastewater Operations	5.32
6.7.	Solid Waste and Renewable Resource Management	7.45
6.8.	Contaminants and Pollution Control	7.45
6.9.	Hazardous Materials and Waste Management	5.32
6.10.	Ecosystems	8.51
6.11	Habitat Management and Restoration	8.51
<b>Strand 8. Plant Science</b>		
8.3.	Pest Management	2.13
<b>Strand 9. Energy</b>		
9.1.	Energy Source	8.51

