

# STATEWIDE VALIDATION

of  
National Career Cluster Knowledge and Skills Statements  
with  
Suggestions to Better Prepare the Workforce of Tomorrow

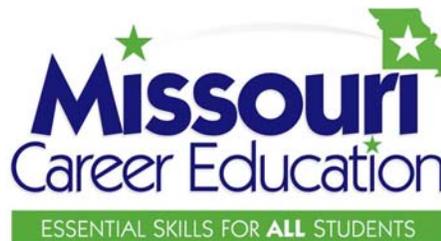
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*Responses Received from Online Survey of Missouri Business and Industry  
Conducted November 20, 2006 through January 8, 2007*

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## 16 Career Clusters

- *Agriculture, Food and Natural Resources*
- ***Architecture and Construction***
- *Arts, Audio-Visual Technology, and Communication*
- *Business, Management and Administration*
- *Education and Training*
- *Finance*
- *Government and Public Administration*
- *Health*
- *Hospitality and Tourism*
- *Human Services*
- *Information Technology*
- *Law, Public Safety, Corrections and Security*
- *Manufacturing*
- *Marketing, Sales and Service*
- *Science, Technology, Engineering and Mathematics*
- *Transportation, Distribution and Logistics*



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How essential are the following cluster FOUNDATION knowledge and skills to a career in Architecture and Construction? (Section 1 of 6) ACADEMIC

	<b>Very Important</b>	<b>Important</b>	<b>Slightly Important</b>	<b>Not Important</b>	<b>No opinion</b>	<b>Response Average</b>
Perform math operations to complete jobsite/workplace tasks such as estimating and distributing materials and supplies.	<b>86% (63)</b>	14% (10)	0% (0)	0% (0)	0% (0)	<b>1.14</b>
Perform physics skills to work with materials and load applications.	34% (25)	<b>44% (32)</b>	16% (12)	5% (4)	0% (0)	<b>1.93</b>
Manage workplace and jobsite chemical materials safely.	21% (15)	<b>49% (35)</b>	25% (18)	4% (3)	0% (0)	<b>2.13</b>
Read, understand and respond to English language technical and workplace documents to effectively function in the workplace/jobsite.	<b>78% (57)</b>	22% (16)	0% (0)	0% (0)	0% (0)	<b>1.22</b>
Write clear and effective English to prepare workplace/jobsite information.	<b>68% (50)</b>	29% (21)	3% (2)	0% (0)	0% (0)	<b>1.34</b>
<b>Total Respondents</b>						<b>73</b>

How essential are the following cluster FOUNDATION knowledge and skills to a career in Architecture and Construction? (Section 2 of 6) COMMUNICATIONS

	<b>Very Important</b>	<b>Important</b>	<b>Slightly Important</b>	<b>Not Important</b>	<b>No opinion</b>	<b>Response Average</b>
Use and follow industry specific verbal and visual skills to accomplish workplace/jobsite communications.	<b>72% (50)</b>	28% (19)	0% (0)	0% (0)	0% (0)	<b>1.28</b>
Exhibit public relation skills to address a variety of situations such as increasing internal and external customer/client satisfaction.	<b>48% (33)</b>	45% (31)	7% (5)	0% (0)	0% (0)	<b>1.59</b>

Identify the relationship between available resources and requirements of a project/problem to accomplish realistic planning.	43% (30)	<b>49% (34)</b>	4% (3)	3% (2)	0% (0)	<b>1.67</b>
Evaluate and adjust plans/schedules to respond to unexpected events and conditions.	<b>62% (43)</b>	32% (22)	6% (4)	0% (0)	0% (0)	<b>1.43</b>
Synthesize and report conditions to keep the organization appraised of progress and problems.	39% (27)	<b>49% (34)</b>	10% (7)	1% (1)	0% (0)	<b>1.74</b>
Listen to and speak with a variety of individuals to enhance communications skills.	<b>55% (38)</b>	35% (24)	10% (7)	0% (0)	0% (0)	<b>1.55</b>
<b>Total Respondents</b>						<b>69</b>

How essential are the following cluster FOUNDATION knowledge and skills to a career in Architecture and Construction? (Section 3 of 6) INFORMATION TECHNOLOGY APPLICATIONS

	<b>Very Important</b>	<b>Important</b>	<b>Slightly Important</b>	<b>Not Important</b>	<b>No opinion</b>	<b>Response Average</b>
Use information technology tools specific to Architecture and Construction to access, manage, integrate and create information.	42% (27)	<b>50% (32)</b>	8% (5)	0% (0)	0% (0)	<b>1.66</b>
Use electronic mail applications.	35% (23)	<b>47% (31)</b>	17% (11)	2% (1)	0% (0)	<b>1.85</b>
Use Internet applications.	27% (18)	<b>52% (34)</b>	18% (12)	3% (2)	0% (0)	<b>1.97</b>
Use writing/publishing applications.	21% (14)	<b>45% (30)</b>	30% (20)	4% (3)	0% (0)	<b>2.18</b>
Use spreadsheet applications.	27% (18)	<b>51% (34)</b>	19% (13)	1% (1)	1% (1)	<b>1.95</b>
Use database applications.	16% (11)	<b>42% (28)</b>	34% (23)	4% (3)	3% (2)	<b>2.28</b>
Use collaborative/groupware applications.	12% (8)	36% (24)	<b>37% (25)</b>	7% (5)	7% (5)	<b>2.44</b>
Use computer operations applications.	26% (17)	<b>39% (26)</b>	24% (16)	8% (5)	3% (2)	<b>2.14</b>
Use computer-based equipment (containing embedded computers (or processors) used to control electromechanical devices).	21% (14)	<b>39% (26)</b>	22% (15)	13% (9)	4% (3)	<b>2.30</b>

<b>Total Respondents</b>	<b>67</b>
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How essential are the following cluster FOUNDATION knowledge and skills to a career in Architecture and Construction? (Section 4 of 6) SYSTEMS, SAFETY

	<b>Very Important</b>	<b>Important</b>	<b>Slightly Important</b>	<b>Not Important</b>	<b>No opinion</b>	<b>Response Average</b>
Comply with governmental regulations and applicable codes to establish a legal and safe workplace/jobsite.	<b>69% (46)</b>	25% (17)	6% (4)	0% (0)	0% (0)	<b>1.37</b>
Examine relationship of roles and responsibilities between trades/professions to complete a project/job.	41% (27)	<b>45% (30)</b>	12% (8)	2% (1)	0% (0)	<b>1.74</b>
Examine all aspects of the built environment and its systems to complete project planning.	37% (25)	<b>48% (32)</b>	15% (10)	0% (0)	0% (0)	<b>1.78</b>
Apply industry standards and practices for quality to ensure quality work.	<b>67% (45)</b>	27% (18)	6% (4)	0% (0)	0% (0)	<b>1.39</b>
Observe rules and regulations to comply with personal and jobsite safety standards.	<b>76% (51)</b>	16% (11)	7% (5)	0% (0)	0% (0)	<b>1.31</b>
<b>Total Respondents</b>						<b>67</b>

How essential are the following cluster FOUNDATION knowledge and skills to a career in Architecture and Construction? (Section 5 of 6) LEADERSHIP AND TEAMWORK:

	<b>Very Important</b>	<b>Important</b>	<b>Slightly Important</b>	<b>Not Important</b>	<b>No opinion</b>	<b>Response Average</b>
Establish specific goals to manage project assignments in a timely manner.	43% (29)	<b>54% (36)</b>	3% (2)	0% (0)	0% (0)	<b>1.60</b>
Effectively resolve conflicts with co-workers to maintain a smooth workflow.	39% (26)	<b>48% (32)</b>	13% (9)	0% (0)	0% (0)	<b>1.75</b>
Work as an individual and as a team member to accomplish assignments.	<b>60% (40)</b>	39% (26)	1% (1)	0% (0)	0% (0)	<b>1.42</b>
Use mentoring skills to inspire others to achieve.	33% (22)	<b>48% (32)</b>	19% (13)	0% (0)	0% (0)	<b>1.87</b>
Exhibit personal accountability, integrity and responsibility to enhance confidence among co-workers.	<b>64% (43)</b>	31% (21)	4% (3)	0% (0)	0% (0)	<b>1.40</b>
Read regulations and contracts to ensure ethical and safety elements are observed.	<b>49% (33)</b>	40% (27)	9% (6)	0% (0)	1% (1)	<b>1.59</b>
Use ethical and legal standards to avoid conflicts of interest.	<b>51% (34)</b>	36% (24)	13% (9)	0% (0)	0% (0)	<b>1.63</b>
Recognize legal and ethical relationships between employees and employers to establish workplace/jobsite rules, regulations and guidelines.	37% (25)	<b>45% (30)</b>	16% (11)	1% (1)	0% (0)	<b>1.82</b>
Exhibit a positive work ethic to comply with employment requirements.	<b>63% (42)</b>	36% (24)	1% (1)	0% (0)	0% (0)	<b>1.39</b>
Recognize requirements for career advancement to plan for continuing education and training.	40% (27)	<b>45% (30)</b>	15% (10)	0% (0)	0% (0)	<b>1.75</b>
Examine licensing, certification and credentialing requirements at the national, state, and local levels to achieve compliance.	37% (25)	<b>43% (29)</b>	19% (13)	0% (0)	0% (0)	<b>1.82</b>

Recognize the responsibilities and personal characteristics of a professional craftsperson to develop personal goals for professionalism.	46% (31)	<b>48% (32)</b>	6% (4)	0% (0)	0% (0)	<b>1.60</b>
Maintain a career portfolio to document knowledge, skills and abilities.	21% (14)	<b>39% (26)</b>	<b>39% (26)</b>	1% (1)	0% (0)	<b>2.21</b>
<b>Total Respondents</b>						<b>67</b>

How essential are the following cluster FOUNDATION knowledge and skills to a career in Architecture and Construction? (Section 6 of 6) TECHNICAL SKILLS:

	<b>Very Important</b>	<b>Important</b>	<b>Slightly Important</b>	<b>Not Important</b>	<b>No opinion</b>	<b>Response Average</b>
Read technical drawings and documents to plan a project.	<b>90% (60)</b>	10% (7)	0% (0)	0% (0)	0% (0)	<b>1.10</b>
Use and maintain appropriate tools, machines and equipment to accomplish project goals.	<b>62% (42)</b>	32% (22)	4% (3)	1% (1)	0% (0)	<b>1.46</b>
<b>Total Respondents</b>						<b>68</b>

What other skills and knowledge are essential as a foundation for success in an array of careers and educational pursuits in the Architecture and Construction career cluster?

<b>Total Respondents</b>	<b>13</b>
(See Comments page)	

Please select a career pathway:

		<b>Response Percent</b>	<b>Response Total</b>
<b>Design/Pre-Construction</b>		<b>44.3%</b>	<b>31</b>
Construction		41.4%	29
Maintenance/Operations		14.3%	10
<b>Total Respondents</b>			<b>70</b>

How essential are the following skills for the "Design/Pre-Construction" career pathway?

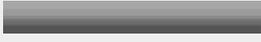
	<b>Very Important</b>	<b>Important</b>	<b>Slightly Important</b>	<b>Not Important</b>	<b>No opinion</b>	<b>Response Average</b>
Employ basic methods of data collection and analysis to provide information for projects.	40% (12)	<b>53% (16)</b>	7% (2)	0% (0)	0% (0)	<b>1.67</b>
Work with potential clients.	<b>50% (15)</b>	43% (13)	3% (1)	0% (0)	3% (1)	<b>1.52</b>
Integrate structural systems, environmental systems, safety systems, building envelope systems and building service systems to design modern buildings.	<b>57% (17)</b>	43% (13)	0% (0)	0% (0)	0% (0)	<b>1.43</b>
Review traditional project phases and various roles within them to plan for and implement phases within a project..	40% (12)	<b>50% (15)</b>	10% (3)	0% (0)	0% (0)	<b>1.70</b>
Apply the basic principles of environmental impact to enhance project acceptance and quality.	37% (11)	<b>40% (12)</b>	20% (6)	0% (0)	3% (1)	<b>1.83</b>
Apply design requirements to accommodate people with varying physical abilities.	<b>43% (13)</b>	40% (12)	17% (5)	0% (0)	0% (0)	<b>1.73</b>
Appreciate the diversity of needs, values and social patterns in project design.	30% (9)	<b>47% (14)</b>	20% (6)	3% (1)	0% (0)	<b>1.97</b>

Use drawings and computer-generated plans to develop a technical set of drawings.	<b>73% (22)</b>	17% (5)	10% (3)	0% (0)	0% (0)	<b>1.37</b>
Employ appropriate representational media to convey essential formal elements.	30% (9)	<b>50% (15)</b>	20% (6)	0% (0)	0% (0)	<b>1.90</b>
Study principles, conventions, standards, applications and restrictions pertaining to the manufacture and use of construction materials, components and assemblies to incorporate into project design.	37% (11)	<b>43% (13)</b>	20% (6)	0% (0)	0% (0)	<b>1.83</b>
Apply basic organizational, spatial, structural and constructional principles to the design of interior and exterior space.	<b>63% (19)</b>	37% (11)	0% (0)	0% (0)	0% (0)	<b>1.37</b>
<b>Total Respondents</b>						<b>30</b>

What other skills and knowledge are essential for this career pathway?

<b>Total Respondents</b>	<b>1</b>
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How would you characterize your relationship to the workforce in the career pathway of Design/Pre-Construction? Answer as many as applicable.

		<b>Response Percent</b>	<b>Response Total</b>
I make hiring decisions		63.3%	19
I supervise people who are in this career field		66.7%	20
<b>I work in this career field</b>		<b>86.7%</b>	<b>26</b>
I have a friend or relative who works in this career field		40%	12
I have an interest in improving the quality of the workforce in this area		63.3%	19

I have an interest in attracting more people to this career field		56.7%	17
I have no professional connection with this career field		3.3%	1
Other (please specify)		3.3%	1
<b>Total Respondents</b>			<b>30</b>

Thank you for your responses. Please indicate what you would like to do next.

		Response Percent	Response Total
<b>Continue to the final wrap-up questions of this survey.</b>		93.1%	27
Return to the Architecture and Construction list to select another career pathway.		6.9%	2
<b>Total Respondents</b>			<b>29</b>

How essential are the following skills for the "Construction" career pathway?

	Very Important	Important	Slightly Important	Not Important	No opinion	Response Average
Recognize universal signs and symbols such as colors, flags, stakes and hand signals to function safely in the workplace.	53% (16)	37% (11)	10% (3)	0% (0)	0% (0)	1.57
Examine building systems and components to evaluate their usefulness to a project.	33% (10)	40% (12)	20% (6)	7% (2)	0% (0)	2.00
<b>Total Respondents</b>						<b>30</b>

What other skills and knowledge are essential for this career pathway?

<b>Total Respondents</b>	<b>5</b>
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How would you characterize your relationship to the workforce in the career pathway of Construction? Answer as many as applicable.

		<b>Response Percent</b>	<b>Response Total</b>
I make hiring decisions		59.4%	19
I supervise people who are in this career field		62.5%	20
<b>I work in this career field</b>		<b>75%</b>	<b>24</b>
I have a friend or relative who works in this career field		50%	16
I have an interest in improving the quality of the workforce in this area		65.6%	21
I have an interest in attracting more people to this career field		71.9%	23
I have no professional connection with this career field		6.2%	2
Other (please specify)		6.2%	2
<b>Total Respondents</b>			<b>32</b>

Thank you for your responses. Please indicate what you would like to do next.

		<b>Response Percent</b>	<b>Response Total</b>
<b>Continue to the final wrap-up questions of this survey.</b>		<b>93.1%</b>	<b>27</b>
Return to the Architecture and Construction list to select another pathway.		6.9%	2
<b>Total Respondents</b>			<b>29</b>

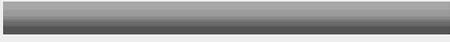
How essential are the following skills for the "Maintenance/Operations" career pathway?

	<b>Very important</b>	<b>Important</b>	<b>Slightly Important</b>	<b>Not Important</b>	<b>No opinion</b>	<b>Response Average</b>
Recognize universal signs and symbols such as colors, flags, stakes and hand signals to function safely in the workplace.	<b>55% (6)</b>	36% (4)	0% (0)	0% (0)	9% (1)	<b>1.40</b>
Use troubleshooting procedures to solve a maintenance problem.	<b>100% (11)</b>	0% (0)	0% (0)	0% (0)	0% (0)	<b>1.00</b>
Apply construction skills to restoration of existing structures.	45% (5)	<b>55% (6)</b>	0% (0)	0% (0)	0% (0)	<b>1.55</b>
Evaluate the work required to repair existing structures.	<b>73% (8)</b>	27% (3)	0% (0)	0% (0)	0% (0)	<b>1.27</b>
Practice preventative maintenance to service existing structures.	<b>82% (9)</b>	18% (2)	0% (0)	0% (0)	0% (0)	<b>1.18</b>
Maintain and use operational systems to achieve smooth operation of facilities.	<b>73% (8)</b>	27% (3)	0% (0)	0% (0)	0% (0)	<b>1.27</b>
<b>Total Respondents</b>						<b>11</b>

What other skills and knowledge are essential for this career pathway?

<b>Total Respondents</b>	<b>1</b>
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How would you characterize your relationship to the workforce in the career pathway of Maintenance/Operations? Answer as many as applicable.

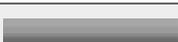
		<b>Response Percent</b>	<b>Response Total</b>
I make hiring decisions		69.2%	9
I work in this career field		69.2%	9
<b>I supervise people who are in this career field</b>		<b>84.6%</b>	<b>11</b>
I have an interest in improving the quality of the workforce in this area		61.5%	8
I have an interest in attracting more people to this career field		38.5%	5
I have no professional connection with this career field		7.7%	1
I have a friend or relative who works in this career field		15.4%	2
No response		0%	0
<b>Total Respondents</b>			<b>13</b>

Thank you for your responses. Please indicate what you would like to do next.

		<b>Response Percent</b>	<b>Response Total</b>
<b>Continue to the final wrap-up questions of this survey.</b>		<b>91.7%</b>	<b>11</b>
Return to the Architecture and Construction list to select another pathway.		8.3%	1
<b>Total Respondents</b>			<b>12</b>

In which state do you live?			
		Response Percent	Response Total
Missouri		95.5%	63
Other (please specify)		4.5%	3
<b>Total Respondents</b>			<b>66</b>

Please indicate the professional area in which you work:			
		Response Percent	Response Total
Business/Industry		75.8%	50
State Agency		4.5%	3
Federal Agency		0%	0
Association/Chamber		1.5%	1
Secondary Education		3%	2
Postsecondary Education		7.6%	5
Other (please specify)		7.6%	5
<b>Total Respondents</b>			<b>66</b>

Years of work experience:			
		Response Percent	Response Total
Student		0%	0
0-1		0%	0
2-5		4.5%	3
6-10		4.5%	3
11-20		24.2%	16
21-30		27.3%	18
31+		39.4%	26

<b>Total Respondents</b>	<b>66</b>

What other comments would you like to add related to career education in Missouri?

<b>Total Respondents</b>	<b>7</b>

Would you be willing to participate in future surveys like this related to Missouri Career Education and workforce development?

		<b>Response Percent</b>	<b>Response Total</b>
<b>Yes</b>		<b>52.3%</b>	<b>34</b>
Maybe		21.5%	14
No		26.2%	17
<b>Total Respondents</b>			<b>65</b>

Would you be willing to serve on a local or state advisory council for the betterment of career education and workforce preparation in Missouri?

		<b>Response Percent</b>	<b>Response Total</b>
Yes		29.7%	19
Maybe		29.7%	19
No		<b>40.6%</b>	<b>26</b>
<b>Total Respondents</b>			<b>64</b>

If you indicated "yes" or "maybe" to either of the two questions above, please provide DESE your contact information (include name, company, address, telephone number, and e-mail address). This information will be used solely for the purposes described.

<b>Total Respondents</b>	<b>30</b>

## Through which channel did you receive this survey?

		<b>Response Percent</b>	<b>Response Total</b>
Trade association or professional society		22.7%	15
Chamber of Commerce or industry group		0%	0
Business colleague		3%	2
<b>e-mail from Department of Elementary and Secondary Education</b>		<b>48.5%</b>	<b>32</b>
Educator		16.7%	11
Website link		4.5%	3
Word-of-mouth		0%	0
Other (please specify)		4.5%	3
<b>Total Respondents</b>			<b>66</b>

## Was this survey easy to use?

		<b>Response Percent</b>	<b>Response Total</b>
<b>Yes</b>		<b>81.8%</b>	<b>54</b>
No		3%	2
Somewhat		12.1%	8
Comments		3%	2
<b>Total Respondents</b>			<b>66</b>

## COMMENTS FOR ARCHITECTURE AND CONSTRUCTION:

### FOUNDATION Knowledge and Skills:

What other skills and knowledge are essential as a foundation for success in an array of careers and educational pursuits in the Architecture and Construction career cluster?	
1.	the key element would include the ability to communicate both written and verbal.
2.	If a student do all of the above. They will be well prepared for the work world.
3.	Recognize importance of good attendance. Have a good work ethic.
4.	Positive attitude and ersonal discipline, which probably can not be taught.
5.	Initiative and Good Attitude a must Good eye hand coordination Drug Free Like working outdoors Learn how to budget money Continuing education and training
6.	Personal communication skills, punctuality, work ethic, unselfishness, and other skills that were formerly taught in Kindergarten before political correctness and individuality became paramount virtues of the public school system.
7.	personal responsibility IE, arrive to work on time prepared to work.
8.	Engineering Drawing with hand lettering skills Organizational skills training Make decisions based upon fact gathering Eliminate any concensus building
9.	I could't over stress the importance of good communication skills, including the ability to speak, listen and write. I find that one's ability to communicate directly affects one's level of success.
10.	a good work ethic. be respectful, and show up on time.
11.	Good attitude, willingness to work, completing work when promised. Ask questions when you hit a "roadblock" so that you don't burn a lot of non-productive time trying to figure out something that a seasoned employee can resolve quickly and get you productively back to work.
12.	Good handwriting skills are a must for taking field measurements and notes & conveying them to others working on the project.
13.	It seems you covered them! I cannot stress the importance of the basics plus a good attitude (reading, writing, and math + attitude).

### PATHWAY Knowledge and Skills:

#### DESIGN/PRE-CONSTRUCTION

What other skills and knowledge are essential for this career pathway?	
1.	A willingness to accommodate other disciplines when it's appropriate; be a team player. Be responsive to the other team members.

#### CONSTRUCTION

What other skills and knowledge are essential for this career pathway?	
1.	Ability to work with co-workers
2.	Passion for the job, punctuality, and getting along well with other people
3.	Conceptualize three dimension from two dimension training
4.	Math, Organizational, communications, reading skills,
5.	Not only to work in a safe manner but also with a productive/quality mindset.

**MAINTENANCE/OPERATIONS**

What other skills and knowledge are essential for this career pathway?

1. Good working knowledge of building automation control systems. Good working knowledge of CMMS systems.

**OTHER COMMENTS:**

What other comments would you like to add related to career education in Missouri?

1. Make it easier for students to participate in career education instead of so much emphasis on academic subjects.
2. Educate High School Students about careers in the Construction Industry
3. I feel that this survey was very poorly assembled and is biased toward the construction industry, not design careers. I believe it will not be very helpful in your endeavor.
4. In an educational system dominated by impersonal computers, people skills are becoming increasingly non-existent.
5. We need more logical common sense thinkers.
6. I haven't noticed much emphasis on careers until about the 11th or 12th grades.
7. In today's world many careers require a college education. While it is important in many areas of construction there are also many other areas such as the trades or job superintendent that do not require a degree. These jobs can pay anywhere from \$50,000 to \$75,000 a year. There are many students in high school who would be very successful at these careers but are not aware of the opportunity.