

CERTIFIED QUALITY PROCESS ANALYST (CQPA) BODY OF KNOWLEDGE MAP 2020

The Certified Quality Process Analyst (CQPA) Body of Knowledge (BoK) has been updated to ensure that the most current state of practice is being tested in the examination. If you would like more information on how a BoK is updated, see a description of the process on <http://asq.org/cert/faq/create-body-of-knowledge>.

Part of the updating process is to conduct a content validation survey to determine whether the topics in the 2013 BoK are still relevant to the role of quality process analysts and to identify any new topics that have emerged since that BoK was developed. The results of the CQPA content validation survey showed that most of the topics that were in the 2013 BoK are still relevant to quality process analysts in 2020. Six new areas were added to the 2020 BoK and parts of subtext were removed, as indicated in Table 2.

The 2020 Certified Quality Process Analyst Body of Knowledge (CQPA BoK) will be introduced at the **August 2020** administration. Both BoKs will be available online until October 1, 2020, at which time the 2013 BoK will be removed.

General comments about ASQ Body of Knowledge updates

When the Body of Knowledge (BoK) is updated for an ASQ exam, most of the material covered in the BoK remains the same. There are very few programs that change significantly over a 5-7 year period. One of the points that we make to all the exam development committees is that ASQ Certification Exams need to reflect “the state of practice” not “the state of the art.” This helps to keep the programs grounded in what people currently do, rather than being driven by the latest hot-topic improvement idea or trend. Typically, the biggest change in any updated BoK is in how the content is organized. When a new BoK is announced and posted on the ASQ website, we also include a “BoK Map” that highlights the changes between the two Bodies of Knowledge: old and new. The BoK map also clearly identifies any new content that has been added to the exam, as well as any content that has been removed from the exam.

With regard to exam preparation materials, you should be able to use any of the reference books that are currently listed on the exam program reference list. These are the source materials that the exam development committees use to write questions and verify answers.

Specific comments about the 2020 CQPA Body of Knowledge updates

The CQPA Body of Knowledge mostly stayed the same with the 2020 update. Two new topics were added to Section I: Quality (I.B.1) and Team stages (I.D.3). Two new topics were added to Section II: Risk management (II.C.4) and Business process management (BPM) (II.C.5). One new topic was added to Section III: Data integrity (III.B.4). One new topic was added to Section 4: Supplier selection (IV.D.1) There were no major changes to content in Section V: Corrective and Preventive Action (CAPA). In addition to a total of six new topics and minor removal/edits of content, there were six topics that increased in level of cognition: III.A.1, III.D, III.E.1, III.E.2, III.E.4, III.F.3, and two topics that decreased in level of cognition: II.D.2 and III.B.3.

Table 1 below details the change in items allocated to each section of the Body of Knowledge. The section names have remained the same except for Section I that is now Quality Concepts and Team Dynamics and Section II that is now Quality Tools and Process Improvement Techniques. Table 2, on page 3, presents the 2020 CQPA BoK and maps the topics to the 2013 BoK. Table 3, starting on page 11, presents the 2013 CQPA BoK and maps the topics to the 2020 BoK. Details on changes between the two can be found below.

Table 1. BoK Section Item Allocation

BoK Sections	2013 BoK	2020 BoK	Change
I. Quality Concepts	22	20	-2
II. Quality Tools and Process Improvement Techniques	22	26	+4
III. Data Analysis	33	33	0
IV. Customer-Supplier Relations	15	13	-2
V. Corrective and Preventive Action	8	8	0

Table 2. 2020 CQPA BoK mapped to the 2013 CQPA BoK

2013 BoK Code	2020 BoK Details	Notes
	I. Quality Concepts and Team Dynamics [20 Questions]	Section renamed to “Quality Concepts and Team Dynamics” Number of questions changed from 22 to 20
I.E	A. Professional Conduct and Ethics Identify and apply behaviors that are aligned with the ASQ Code of Ethics. (Apply)	
I.A	B. Quality Concepts	
NEW	1. Quality Describe how using quality techniques to improve processes, products, and services can benefit all parts of an organization. Describe what quality means to various stakeholders (e.g., employees, organization, customers, suppliers, community) and how each can benefit from quality. (Understand)	
I.A.1	2. Quality planning Define a quality plan, describe its purpose for the organization as a whole, and know who has responsibility for contributing to its development. (Understand)	
I.A.2	3. Quality standards, requirements, and specifications Define and distinguish between national or international standards, customer requirements, and product or process specifications. (Understand)	
I.A.4	4. Quality documentation Identify and describe common elements of various document control systems, including configuration management. Describe the relationship between quality manuals, procedures, and work instructions. (Understand)	
I.A.3	5. Cost of quality (COQ) Define and describe the four basic cost of quality categories: prevention, appraisal, internal failure, and external failure. (Understand)	
I.B	C. Quality Audits	
I.B.1	1. Audit types Define and distinguish between basic audit types, including internal and external audits; product, process, and systems audits; and first-, second-, and third-party audits. (Understand)	
I.B.2	2. Audit components Identify various elements of the audit process, including audit purpose and scope, the standard to audit against, audit planning (preparation) and performance, opening and closing meetings, final audit report, and verification of corrective actions. (Understand)	

2013 BoK Code	2020 BoK Details	Notes
I.B.3	3. Audit roles and responsibilities Identify and describe the roles and responsibilities of key audit participants: lead auditor, audit team member, client, and auditee. (Understand)	
I.D	D. Team Dynamics	
I.D.1	1. Types of teams Distinguish between various types of teams: process improvement teams, workgroups/workcells, self-managed teams, temporary/ad hoc project teams, and cross-functional teams. (Analyze)	
I.D.2	2. Team development Identify various elements in team-building such as inviting team members to share information about themselves during the initial meeting, using ice-breaker activities to enhance team membership, and developing a common vision and agreement on team objectives. (Apply)	Subtopic renamed to “Team development”
NEW	3. Team stages Describe the classic stages of team evolution: forming, storming, norming, performing, and adjourning. (Understand)	
I.D.3	4. Team roles and responsibilities Describe the roles and responsibilities of various team stakeholders: sponsor, champion, facilitator, team leader, and team member. (Understand)	
I.D.4	5. Team conflict Identify common group challenges, including groupthink, members with hidden and/or competing agendas, intentional distractions, and other disruptive behaviors. Describe ways of resolving these issues and keeping team members on task. (Understand)	Added “groupthink” and “and/or competing”
I.D.5	E. Training and Evaluation Describe various elements of training, including linking the training to organizational goals, identifying training needs, adapting information to meet adult learning styles, and using coaching and peer training methods. Use various tools to measure the effectiveness of the training, including post-training feedback, end-of-course tests, and individual and department performance improvements measures. (Understand)	

2013 BoK Code	2020 BoK Details	Notes
	II. Quality Tools and Process Improvement Techniques [26 Questions]	Section renamed to “Quality Tools and Process Improvement Techniques” Number of questions changed from 22 to 26
II.A	A. Process Improvement Concepts and Approaches Define and explain elements of Plan-Do-Check-Act (PDCA), kaizen activities, incremental and breakthrough improvement, and DMAIC phases (define, measure, analyze, improve, control). (Apply)	Heading renamed to “Process Improvement Concepts and Approaches” Added “DMAIC phases”
I.C.1, I.C.2, I.C.3, I.C.4, I.C.5, I.C.6, I.C.7	B. Basic Quality Tools Select, construct, apply, and interpret the seven basic quality tools: 1) cause and effect diagrams, 2) flowcharts (process maps), 3) check sheets, 4) Pareto charts, 5) scatter diagrams, 6) run charts and control charts, and 7) histograms. (Evaluate)	Added “Basic” to the heading and “run charts” to #6
II.B	C. Process Improvement Techniques	
II.B.2	1. Lean Identify and apply lean concepts and tools, including set-up reduction (SUR), pull (including just-in-time (JIT) and kanban), 5S, continuous flow manufacturing (CFM), value-added analysis, value stream mapping, theory of constraints (TOC), poka-yoke, and total productive/predictive maintenance (TPM) to reduce waste in areas of cost, inventory, labor, and distance. (Apply)	Updated “tools and processes” to “concepts and tools” Added “value-added analysis”, “mapping” to value stream, and “theory of constraints (TOC)”
II.B.1	2. Six sigma Identify key six sigma concepts, including variation reduction, voice of the customer (VOC), belt levels (yellow, green, black, master black), and their roles and responsibilities. (Understand)	Removed “DMAIC methodology” and “project types and processes used” Added “variation reduction”, “voice of the customer (VOC)”, “yellow belt”, and “master black belt”
II.B.3	3. Benchmarking Define and describe this technique and how it can be used to support best practices. (Understand)	
NEW	4. Risk management Recognize the types of risk that can occur throughout the organization, such as scheduling, shipping/receiving, financials, operations and supply chain, employee and user safety, and regulatory compliance and changes. Describe risk control and mitigation methods: avoidance, reduction, prevention, segregation, and transfer. (Understand)	
NEW	5. Business process management (BPM) Define and describe this continuous process improvement practice, including the business process lifecycle phases (Design, Modeling, Execution, Monitoring, and Optimization). (Understand)	

2013 BoK Code	2020 BoK Details	Notes
II.C	D. Management and Planning Tools	Heading renamed to “Management and Planning Tools”
II.C.1	1. Quality management tools Select and apply affinity diagrams, tree diagrams, process decision program charts, matrix diagrams, interrelationship digraphs, prioritization matrices, and activity network diagrams. (Apply)	Removed “basic” from heading
II.C.2	2. Project management tools Select and interpret scheduling and monitoring tools, such as Gantt charts, program evaluation and review technique (PERT), and critical path method (CPM). (Apply)	Decreased cognitive level to Apply
	III. Data Analysis [33 Questions]	
III.A	A. Basic Concepts	Heading renamed to “Basic Concepts”
III.A.1	1. Basic statistics Define, calculate, and interpret measures of central tendency (mean, median, mode) and measures of dispersion (standard deviation, range, variance). (Analyze)	Increased cognitive level to Analyze
III.A.2	2. Basic distributions Define and explain frequency distributions (normal, binomial, Poisson, and Weibull) and the characteristics of skewed and bimodal distributions. (Understand)	
III.A.3	3. Probability concepts Describe and use probability concepts: independent and mutually exclusive events, combinations, permutations, additive and multiplicative rules, and conditional probability. Perform basic probability calculations. (Apply)	
III.A.4	4. Reliability concepts Define basic reliability concepts: mean time to failure (MTTF), mean time between failures (MTBF), mean time between maintenance (MTBM), mean time to repair (MTTR). Identify elements of the bathtub curve model and how they are used to predict failure patterns. (Remember)	
III.B	B. Data Types, Collection, and Integrity	Heading renamed to “Data Types, Collection, and Integrity” Broken down into five subtopics
III.A.5	1. Measurement scales Define and use nominal, ordinal, interval, and ratio measurement scales. (Apply)	

2013 BoK Code	2020 BoK Details	Notes
III.B	<p>2. Data types Identify, define, and classify data in terms of continuous (variables) and discrete (attributes or counts). Determine when it is appropriate to convert attributes data to variables measures. (Apply)</p>	Added “or counts”
III.B	<p>3. Data collection and analysis Identify and describe the advantages of collecting and analyzing real-time data. (Understand)</p>	Revised subtext for clarification Decreased cognitive level to Understand
NEW	<p>4. Data integrity Recognize methods that verify data validity and reliability from source through data analysis using various techniques such as auditing trails, vendor qualification, error detection software, training for record management etc., to prevent and detect data integrity issues. (Apply)</p>	
III.E.6	<p>5. Data plotting Identify the advantages and limitations of using this method to analyze data visually. (Understand)</p>	Subtopic renamed to “Data plotting” Revised subtext for clarification
III.C	C. Sampling	
III.C.2	<p>1. Sampling methods Define and distinguish between various sampling methods, such as random, sequential, stratified, systemic/fixed sampling, rational subgroup sampling, and attributes and variables sampling. (Understand)</p>	Added “systemic” and “rational subgroup sampling”
III.C.1	<p>2. Acceptance sampling Identify and define sampling characteristics, such as lot size, sample size, acceptance number, and operating characteristic (OC) curve. Identify when to use the probability approach to acceptance sampling. (Understand)</p>	Subtopic renamed to “Acceptance sampling”
III.D	<p>D. Measurement System Analysis Define and distinguish between accuracy, precision, repeatability and reproducibility (gage R&R) studies, bias, and linearity. (Apply)</p>	Increased cognitive level to Apply
III.E	E. Statistical Process Control (SPC)	
III.E.1	<p>1. Fundamental concepts Distinguish between control limits and specification limits, and between process stability and process capability. (Apply)</p>	Subtopic renamed to “Fundamental concepts” Added “and between process stability and process capability” Increased cognitive level to Apply

2013 BoK Code	2020 BoK Details	Notes
III.C.3	2. Rational subgroups Explain and apply the principles of rational subgroups. (Apply)	Increased cognitive level to Apply and updated subtext
III.E.2	3. Control charts for attributes data Identify, select, and interpret control charts (p, np, c, and u) for data that is measured in terms of discrete attributes or discrete counts. (Analyze)	
III.E.3	4. Control charts for variables data Identify, select, and interpret control charts ($\bar{X} - R$, $\bar{X} - s$, and XmR) for data that is measured on a continuous scale. (Analyze)	Increased cognitive level to Analyze
III.E.5	5. Common and special cause variation Interpret various control chart patterns (runs, hugging, trends) to determine process control, and use SPC rules to distinguish between common cause and special cause variation. (Analyze)	
III.E.4	6. Process capability measures Describe the conditions that must be met in order to measure capability. Calculate C_p , C_{pk} , P_p , and P_{pk} measures and interpret their results. (Analyze)	
III.F	F. Advanced Statistical Analysis	
III.F.1	1. Regression and correlation models Describe how these models are used for estimation and prediction. (Apply)	
III.F.2	2. Hypothesis testing Calculate confidence intervals using t tests and the z statistic and determine whether the result is significant. (Analyze)	
III.F.3	3. Design of experiments (DOE) Define and explain basic DOE terms: response, factors, levels, treatment, interaction effects, randomization, error, and blocking. (Understand)	Added “and explain”, “levels”, and “interaction effects” Reordered terms Increased cognitive level to Understand

2013 BoK Code	2020 BoK Details	Notes
II.D	4. Taguchi concepts and methods Identify and describe Taguchi concepts: quality loss function, robustness, controllable and uncontrollable factors, and signal to noise ratio. (Understand)	Subtopic renamed to “Taguchi concepts and methods” Added “quality loss function” Reordered concepts
III.F.4	5. Analysis of Variance (ANOVA) Define key elements of ANOVAs and how the results can be used. (Understand)	
	IV. Customer-Supplier Relations [13 Questions]	Number of questions changed from 15 to 13
IV.A	A. Internal and External Customers and Suppliers Define and distinguish between internal and external customers and suppliers. Describe their impact on products, services, and processes, and identify strategies for working with them to make improvements. (Apply)	
IV.B	B. Customer Satisfaction Methods Describe the different types of tools used to gather customer feedback: surveys, focus groups, complaint forms, and warranty analysis. Explain key elements of quality function deployment (QFD) for understanding and translating the voice of the customer. (Understand)	Added “focus groups” and “for understanding and translating the voice of the customer” Updated subtext for clarification
IV.C	C. Product and Process Approval Systems Describe how validation and qualification methods, including beta testing, first-article, in-process, and final inspection are used to approve new or updated products, processes, and services. (Understand)	
IV.D	D. Supplier Management	Section split into IV.D.1 Supplier selection and IV.D.2 Supplier performance
NEW	1. Supplier selection Describe and outline criteria for selecting, approving, and classifying suppliers, including internal rating programs and external certification standard requirements, including environmental/social responsibility. (Understand)	
IV.D	2. Supplier performance Describe supplier performance in terms of measures such as quality (e.g., defect rates, functional performance), price, delivery speed, delivery reliability, level of service, and technical support. (Understand)	Removed “timeliness, responsiveness”
IV.E	E. Material Identification, Status, and Traceability Describe the importance of identifying material by lot, batch, source, and conformance status, including impact for recalls. Describe key requirements for preserving the identity of a product and its origin. Use various methods to segregate nonconforming material and process it according to procedures. (Apply)	Added “including impact for recalls”

2013 BoK Code	2020 BoK Details	Notes
	V. Corrective and Preventive Action (CAPA) [8 Questions]	
V.A	A. Corrective Action Demonstrate key elements of the corrective action process: identify the problem, contain the problem, determine the root causes, propose solutions to eliminate and prevent their recurrence, verify that the solutions are implemented, and confirm their effectiveness. (Apply)	Updated “determine the causes of the problem” to “determine the root causes”
V.B	B. Preventive Action Demonstrate key elements of a preventive action process: track data trends and patterns, use failure mode and effects analysis (FMEA), review product and process monitoring reports, and study the process to identify potential failures, defects, or deficiencies. Improve the process by developing error/mistake-proofing methods and procedural changes, verify that the changes are made, and confirm their effectiveness. (Apply)	Updated subtext for clarification

Table 3. 2013 CQPA BoK mapped to the 2020 CQPA BoK

2013 BoK		2020 BoK		Notes
Code	Label	Code	Label	
I.A.1	Quality planning	I.B.2	Quality planning	
I.A.2	Quality standards, requirements, and specifications	I.B.3	Quality standards, requirements, and specifications	
I.A.3	Cost of quality (COQ)	I.B.5	Cost of quality (COQ)	
I.A.4	Quality documentation	I.B.4	Quality documentation	
I.B.1	Audit types	I.C.1	Audit types	
I.B.2	Audit components	I.C.2	Audit components	
I.B.3	Audit roles and responsibilities	I.C.3	Audit roles and responsibilities	
I.C.1	Cause and effect diagrams	II.B.1	Cause and effect diagrams	
I.C.2	Flowcharts (process maps)	II.B.2	Flowcharts (process maps)	
I.C.3	Check sheets	II.B.3	Check sheets	
I.C.4	Pareto charts	II.B.4	Pareto charts	
I.C.5	Scatter diagrams	II.B.5	Scatter diagrams	
I.C.6	Control charts	II.B.6	Run charts and control charts	Added “run charts”
I.C.7	Histograms	II.B.7	Histograms	
I.D.1	Types of teams	I.D.1	Types of teams	
I.D.2	Team-building techniques	I.D.2	Team development	Updated subtopic name
I.D.3	Team roles and responsibilities	I.D.4	Team roles and responsibilities	
I.D.4	Team conflict	I.D.5	Team conflict	Added “groupthink” and “and/or competing”
I.D.5	Training and evaluation	I.E	Training and evaluation	

2013 BoK		2020 BoK		Notes
Code	Label	Code	Label	
I.E	Professional Conduct and Ethics	I.A	Professional Conduct and Ethics	
II.A	Continuous Improvement Models	II.A	Process Improvement Concepts and Approaches	Updated topic name Added “DMAIC phases”
II.B.1	Six Sigma	II.C.2	Six sigma	Removed “DMAIC methodology” and “project types and processes used” Added “variation reduction”, “voice of the customer (VOC)”, “yellow belt”, and “master black belt”
II.B.2	Lean	II.C.1	Lean	Updated “tools and processes” to “concepts and tools” Added “value-added analysis”, “mapping” to value stream, and “theory of constraints (TOC)”
II.B.3	Benchmarking	II.C.3	Benchmarking	
II.C.1	Basic quality management tools	II.D.1	Quality management tools	Removed “basic” from heading
II.C.2	Project management tools	II.D.2	Project management tools	Decreased cognitive level to Apply
II.D	Taguchi Loss Function	III.F.4	Taguchi concepts and methods	Updated topic name Added “quality loss function” Reordered concepts
III.A.1	Basic statistics	III.A.1	Basic statistics	Increased cognitive level to Analyze
III.A.2	Basic distributions	III.A.2	Basic distributions	
III.A.3	Probability concepts	III.A.3	Probability concepts	
III.A.4	Reliability concepts	III.A.4	Reliability concepts	
III.A.5	Measurement scales	III.B.1	Measurement scales	

2013 BoK		2020 BoK		Notes
Code	Label	Code	Label	
III.B	Data Types and Data Collection Methods	III.B.2 III.B.3	Data types Data collection and analysis	Split into 2 subtopics <i>Data types</i> : Added “or counts” <i>Data collection and analysis</i> : Added “including special considerations for real time data” and “Identify trends recognized through data analysis”; Removed “and describe the planning and implementation steps that will support meaningful output”; Decreased cognitive level to Understand
III.C.1	Characteristics	III.C.2	Acceptance sampling	Updated subtopic name
III.C.2	Sampling methods	III.C.1	Sampling methods	Added “systemic” and “rational subgroup sampling”
III.C.3	Rational subgroups	III.E.2	Rational subgroups	Increased cognitive level to Apply
III.D	Measurement System Analysis	III.D	Measurement System Analysis	Updated cognitive level to Apply
III.E.1	Control limits and specification limits	III.E.1	Fundamental concepts	Updated subtopic name Added “and between process stability and process capability” Increased cognitive level to Apply
III.E.2	Control charts for attributes data	III.E.3	Control charts for attributes data	
III.E.3	Control charts for variables data	III.E.4	Control charts for variables data	Increased cognitive level to Analyze
III.E.4	Process capability measures	III.E.6	Process capability measures	
III.E.5	Common and special cause variation	III.E.5	Common and special cause variation	
III.E.6	Data graphics	III.B.5	Data plotting	Updated subtopic name
III.F.1	Regression and correlation models	III.F.1	Regression and correlation models	
III.F.2	Hypothesis testing	III.F.2	Hypothesis testing	

2013 BoK		2020 BoK		Notes
Code	Label	Code	Label	
III.F.3	Design of Experiments (DOE)	III.F.3	Design of Experiments (DOE)	Added “and explain”, “levels”, and “interaction effects” Reordered terms Increased cognitive level to Understand
III.F.4	Analysis of Variance (ANOVA)	III.F.5	Analysis of Variance (ANOVA)	
IV.A	Internal and External Customers and Suppliers	IV.A	Internal and External Customers and Suppliers	
IV.B	Customer Satisfaction Methods	IV.B	Customer Satisfaction Methods	Added “focus groups” and “for understanding and translating the voice of the customer”
IV.C	Product and Process Approval Systems	IV.C	Product and Process Approval Systems	
IV.D	Supplier Management	IV.D.1 IV.D.2	Supplier selection Supplier performance	Split into 2 subtopics <i>Supplier performance</i> : Removed “timeliness, responsiveness”
IV.E	Material Identification, Status, and Traceability	IV.E	Material Identification, Status, and Traceability	Added “including impact for recalls”
V.A	Corrective Action	V.A	Corrective action	Updated “determine the causes of the problem” to “determine the root causes”
V.B	Preventive Action	V.B	Preventive action	