



The leader in Project  
Management Training since 1992

Project  
Management  
Professional  
(PMP)<sup>®</sup>  
**EXAM PREP  
BOOT CAMP**

*Based on the PMBOK<sup>®</sup>  
Guide, 5th Ed.*

PMI, PMBOK, PMP<sup>®</sup>, the PMI Registered Education  
Provider logo are registered marks of the Project  
Management Institute, Inc.

**Student  
Edition 5.0**

Attend a LIVE PMP<sup>®</sup> TRAINING  
with the AUTHOR: Richard Perrin

Live or Online / [www.Edwel.com](http://www.Edwel.com)



## Copyright Information

©©2007-2016 by Richard Perrin. No part of this publication may be reproduced or distributed in any form or by any means without the prior written consent of the copyright holder.

This publication PMP® Exam Prep Boot Camp was created by Richard J Perrin Project Engineering Corp in cooperation with Evolutionten Skillware

Release 5.2f

Course Director: Richard J Perrin PMP® MBB CSM® CSP® ACP® QFDBB

## ACKNOWLEDGEMENTS

To Umbrella Editing and Emily R. Asher for a ruthless edit of this manuscript!

To my wife Frances, who put up with all the late hours as I burned the midnight oil to get this done. You are a true believer.

Notice:

**“PMBOK”, “PMI”, “PMP”, “ACP” and “OPM3” are registered marks of the Project Management Institute, Inc.**

“CSM” and “CSP” are registered marks of the Scrum Alliance

All Inputs, Tools and Techniques and Outputs listed in this manual are from the *PMBOK® Guide*, 5th edition.

# Table of Contents

Conventions Used in This Study Guide .....	iv
About the Author .....	iv
How to Use This Guide – READ THIS FIRST!! .....	v
Chapter 1 :PMP® Examination Overview .....	1-1
Section Objectives.....	1-1
PMP® Examination Overview.....	1-2
Examination Question Types .....	1-3
Preparing for the Exam .....	1-4
Useful Exam Tips .....	1-5
Maintaining the PMP Certification .....	1-7
In Summary.....	1-7
Chapter 2 : Project Life Cycle and Organization .....	2-1
Section Objectives.....	2-1
Definition of Project Management .....	2-2
What Is a Project? .....	2-2
Project Constraints.....	2-3
What Are Programs, Portfolios and Sub-Projects? .....	2-4
Process Comparisons .....	2-6
The PMO .....	2-6
Types of PMOs .....	2-7
Project Management, Operations Management and Organizational Strategy .....	2-7
Organizations and Project Management .....	2-8
Business Value.....	2-8
The Project Manager's Role .....	2-9
Organizational Influences on Project Management .....	2-9
Functional Organizations .....	2-10
Functional Advantages and Disadvantages .....	2-11
The Matrixed Organization .....	2-11
Matrixed Advantages and Disadvantages.....	2-12
Projectized Organizations .....	2-13
Projectized Advantages and Disadvantages .....	2-13
Composite Organizations.....	2-14
What Is Your Organizational Structure? .....	2-15
Organizational Process Assets.....	2-15
Enterprise Environmental Factors .....	2-16
Understanding Stakeholder Needs .....	2-17
Project Governance.....	2-17
The Project Team .....	2-18
The Project Life Cycle .....	2-19
Phase-to-Phase Relationships.....	2-19
Project Lifecycle Concepts .....	2-20
The Project Life Cycle Versus the Project Management Life cycle .....	2-22
Defining the Product Life Cycle .....	2-23
MBO, OPM3™ and Progressive Elaboration .....	2-24

Section Review: .....	2-25
Chapter Two Memory Check .....	2-26
Chapter 2 Test .....	2-27
Chapter 2 Test Answers .....	2-32
Chapter 3 Project Management Processes and Knowledge Areas .....	3-2
Section Objectives.....	3-2
The Project Management Process Groups.....	3-3
Initiating Process Group.....	3-4
Planning Process Group .....	3-6
Executing Process Group.....	3-8
Monitoring and Controlling Process Group .....	3-9
Closing Process Group.....	3-11
Project Information.....	3-13
Cross-Cutting Skills .....	3-13
Knowledge Area Logistics.....	3-14
Project Integration Management .....	3-15
Project Scope Management.....	3-16
Project Time Management .....	3-16
Project Cost Management .....	3-17
Project Quality Management.....	3-18
Project Human Resource Management.....	3-18
Project Communications Management .....	3-19
Project Risk Management .....	3-19
Project Procurement Management .....	3-20
Project Stakeholder Management .....	3-21
Role of the Knowledge Areas.....	3-21
Mapping Knowledge Areas to Process Groups .....	3-22
Understanding Process Interactions .....	3-23
In Summary.....	3-25
Chapter Three Memory Check .....	3-25
Chapter 3 Test .....	3-26
Chapter 3 – Test Answers .....	3-31
Chapter 4 : Project Integration Management.....	4-1
Section Objectives.....	4-1
Integration Process Summary .....	4-2
Project Integration Management .....	4-2
Develop the Project Charter .....	4-3
Charter Elements .....	4-3
Project Statement of Work .....	4-4
Business Case .....	4-5
Agreements.....	4-5
Additional Financial Terms.....	4-5
Develop the Project Management Plan .....	4-6
Project Management Plan Defined.....	4-6
Why the Project Management Plan Is Needed.....	4-7
Project Management Plan Components .....	4-8
Project Documents.....	4-9
Baselining the Project Management Plan.....	4-9

Configuration Management.....	4-10
Project Management Information System (PMIS) .....	4-11
Project Kickoff Meeting.....	4-11
Direct and Manage Project Work.....	4-12
Project Execution Actions .....	4-13
Monitor and Control Project Work .....	4-14
Corrective Action .....	4-14
Perform Integrated Change Control .....	4-15
Change Requests and Configuration Management .....	4-16
Who Authorizes Changes? Quick Quiz.....	4-17
Close Project or Phase.....	4-17
Administrative Closure Activities .....	4-18
Contract Closure .....	4-18
Lessons Learned .....	4-19
Project Integration Management – Key Process Interactions .....	4-20
In Summary... ..	4-20
Integration Process Check.....	4-21
Chapter Four Memory Check .....	4-22
Chapter 4 Test .....	4-23
Chapter 4 Test – Answers .....	4-29

## Conventions Used in This Study Guide

- **Exam Tip** - pay particular attention to these exam tips. They outline critical elements you need to know to help you be successful on the exam
- **Brain Dump** - every time you see the following symbol on a manual page or next to a formula, it indicates a formula that you need to memorize for specific questions on the exam:



- This guide focuses on the elements needed to pass the exam. As such, it is not a 'how to' guide. There are plenty of books on project management and its specialties upon which the reader can avail themselves. That being said, this guide contains a number of footnoted references that may be very useful to the project practitioner and are strongly recommended for further study after the reader has passed the PMP® exam(!)

## About the Author

Richard Perrin (PMP® CSM® CSP® ACP® MBB) has worked in the aerospace, finance/brokerage, healthcare, energy, telecommunications, insurance industries and state/federal government for over 30 years. His efforts as a Director of Development for a telco startup helped his company garner the IEC Infovision Award for most innovative AIN product in 1998.

Working primarily for Fortune 100 and Global 10 companies as a Program/Project Manager, he has managed multi-million dollar, international infrastructure deployments, consulted in the

creation of PMOs, functioned as proposal manager, developed workflows and business process focusing on the implementation of lean business process and quality practices for the publishing and telecom industries, as well as the public sector. He has served as a mentor and trainer, delivering formal instruction in CMM/CMML, configuration management, requirements elaboration, project risk management and project management tools & techniques. For the last four years he has devoted his efforts to delivering coaching and training on Agile/Scrum processes across the United States. His book, *Real World Project Management* was published by John Wiley & Sons and released in January of 2008. He was a presenter at the March, 2010 Scrum Gathering in Orlando, Florida on the subject of Scrum and Lean Six Sigma. Most recently, he was selected by the Project Management Institute as an internal reviewer/contributor for the *PMBOK® Guide*, 5th Edition.

## How to Use This Guide – READ THIS FIRST!!

Using this guide correctly will help insure you pass the PMP® exam on your first attempt. Do the following:

- Review each chapter thoroughly. Then review specific areas in the corresponding chapter in the *PMBOK® Guide*. **Pay particular attention to the outputs for each Knowledge Area and the processes that feed into each Knowledge Area. Memorize all Exam Tips and Critical Notes.**
- Take the chapter quiz, marking your answers on a separate sheet of paper. If you scored better than 80% you have a good grasp of the material. If not, mark the chapter for review on your second pass through the manual.
- Go through the remaining chapters using the same approach. When you have completed the guide you will then review the chapters in which you scored below 80%
- Retake the chapter quizzes in which you scored below 80%.
- When you have passed all quizzes at the 80% level, take the post-test; it is a full blown PMP® exam simulation. Give yourself 4 hours to take the sim – if you score better than 80%, you are ready to sit for the exam.
- If you score less than 80%, call the test center where you will be sitting for the exam and reschedule the test! You can do so for up to 48 hours prior to the exam without forfeiting the exam fee.
- If you need additional testing material, sign up for practice tests at:  
<http://iwebprep.com/Default.aspx>

# Chapter 1 :PMP® Examination Overview

## Section Objectives

- Exam Questions
- Exam-Taking Tips
- Maintaining the *PMP*® Certification

	PMP	PMP %
Initiating	26	13%
Planning	48	24%
Executing	62	31%
Monitoring and Controlling	50	25%
Closing	14	7%
Total	200	100.0%
Passing		
Time Limit	4 hours	

### PMP® Examination Overview

- ▶ The PMI® certification examination consists of 200 multiple-choice questions, each question consisting of only four possible answers. The questions that you will see on your specific exam are selected from a bank of over 14,000 questions. There is no way to predetermine what the specific selection mix of questions will be.
- ▶ Unlike the GMAT, The PMI® exam is non-adaptive. You may select questions for review and move on to other questions, returning to those questions that gave you difficulty, without penalty.
- ▶ The PMI® examination is four hours and once begun, the clock will tick until four hours are complete, or the test taker submits the exam for grading prior to the completion of four hours.
- ▶ Make sure you answer all questions - no credit will be given for unanswered questions. In this case an unanswered question is the same as an incorrect answer.
- ▶ There are 25 'pretest' questions on the exam that carry no credit. You are only graded on 175 questions out of the 200 questions presented; however you will not know which questions are experimental and which questions you are being graded on.
- ▶ As of this writing there is no definitive passing score for the exam - for each of the sections outlined above you will be graded either a) Proficient, b) Moderately Proficient, or c) Below Proficient. According to the PMI® Certification Department, the following is In effect:
  - ▶ “There are not a minimum or maximum number of domains or chapters in which candidate needs to demonstrate proficiency in order to pass the exam. The pass/fail rate is determined based on overall performance, not on how many questions were answered right or wrong in a particular domain or chapter .Each of the domains or chapters has a different number of questions within them that are relative to each other but not equal to each other. That means it is possible to score *Below Proficiency* in one of the domains and yet still pass the examination. It all depends on how many items were present in the domains that were failed.”<sup>1</sup>

<sup>1</sup> Helen Welsh, Certification Department, Project Management Institute



## Examination Question Types

Questions on the *PMP*® certification exam are designed to test your analytical abilities, application experience, and general project management knowledge. The types of questions you will see on the exam will fall into the following general categories:

- **Situational:** A scenario or situation will be presented to you in which must analyze the question and choose the best answer based on your experience, analysis, and knowledge. Many test takers state that the predominant percentages of questions on the exam are situational.
- **More than one right answer:** Frequently, a test question will have two or more correct answers; however there will always be one answer that is more correct than the others. In this situation it is usually simple to eliminate at least two of the answers. Focus your attention on what the project manager needs to do next.
- **Extraneous information:** PMI® is famous for the wordy multi-paragraph question, loaded with misdirection (red herrings) and nonessential information that has nothing to do with the actual question. When encountering such questions for the first time, read the answer set and the final paragraph first - this is usually the place where the actual question is contained.
- **Something you never heard of:** Don't be surprised to see a question containing something you have never seen before. The field of project management changes on a daily basis and the tools and techniques used by the project manager are expanding seemingly at a geometric rate. Take your best guess and move on.
- **Mathematical:** Expect to see anywhere from 5 to 10 questions involving formula computations. Earned value, PERT or questions involving standard deviation are typical computation questions.
- **Diagrams:** You may be asked to interpret a graph or construct a precedence diagram from instructions. On the computer at the test center, there may be a button on the screen that you can push that will bring up a graphic or some other diagram. Take advantage of all information provided.
- **Correct answer to a different question:** You will sometimes see answers that may be correct statements by themselves, but do not answer the question.
- **A new approach to a known topic:** You will frequently see questions that will present a different point of view or skew to a known topic. These questions will test concepts but using language that is different from what you studied for the exam. Thus it is critical that the concepts be understood ahead of simple rote memorization of project management knowledge.
- **Double negatives:** A number of questions are designed to be deliberately confusing ("which of the following would NOT be the least likely choice to make..."), which is another way of saying; "what would be your most likely choice".
- **Recall:** There will be a few fairly short questions that test your inventory of certain project management facts and knowledge areas.

**Critical Note:** Make sure you do a careful and thorough read of each question - many of the answers to exam questions turn on a single word. If you skim over or miss that key word, you will get the question wrong. *Read all questions carefully.* Answer what is asked!

## Preparing for the Exam

PMP® exam is four hours and 200 questions - this means that you have approximately 1 minute and 12 seconds to answer each question. In order to ensure an optimal testing experience there are specific stress relievers you can employ that will help you get through the test with a minimum of angst.

Consider the following as part of your test taking strategy:

Arrive Early. Consider traffic and time of day when making your way to the exam center. You don't want to arrive in a rushed or stressed state before the exam begins. ***It is strongly recommended that you scope out the exam facility a week or two before the actual examination, if at all possible.*** You want to know what to expect walking through the door of the test facility. You will be under constant video monitoring and observation for the entire duration of the exam.

Rest Up. Take the evening off from studying the night before the exam - if you don't know the material by this point, cramming into late hours the evening before the test will simply multiply your stress level by a factor of two or three. It is most important that you be rested with a good night's sleep under your belt on the day of the exam. If you can, schedule the test for early afternoon instead of early morning.

Consider Earplugs. There may be some distracting noises in the examination room such as a fan, or test-taker for a different exam tapping a pencil on a desk. Bring earplugs just in case.

Dress in Layers. Frequently exam rooms are air conditioned to a point where they are too cold for many people. Therefore it is recommended that you dress in layers and remove layers or add layers as necessary to maintain your own individual comfort level.

Bring Food and Drink. If you get thirsty or need a nutritional boost during the exam, make sure you bring bottled water, bottled juices, or any snacks you will need for the four-hour test. If you have to leave the room to use a water fountain or go to a vending machine, the test clock will still be ticking.

Do the Brain Dump! Prior to the start of the exam and during the 15 minute tutorial you will have time to write on scratch paper all the formulas you will need for the test. While many of us pride ourselves on our airtight memories, rest assured that if exam panic sets in, all that you thought you had memorized will fly out of your head in an instant. Do yourself a favor and write down these formulas in an unstressed state prior to the actual start of the exam - this will pay dividends many times over while you are taking the exam. Some past test takers have actually reported that examination proctors upon handing scratch paper to the test-taker will state, "don't forget your brain dump".

Formulate a Plan. Have a strategy in mind prior to taking the test. If you know you will need to stand up and stretch after 90 minutes, allocate time in your strategy to do just that. The idea is that you want to pace yourself for your own maximum comfort and effectiveness on exam day. One effective plan involves the following approach:

- Go through the entire exam and answer the questions you can answer very quickly - within 20 to 30 seconds. Mark all other questions for review. You can frequently answer 80 questions in 45 minutes using this approach.
- Now approach all the 'marked for review' questions on the second pass - these questions will take you a little longer to answer but only because they require more thought. You can answer another 70 questions in the next hour and 15 minutes using this approach. Sometimes other questions and answers will jog your memory on a question you marked for review.
- You will now be left with your 50 most difficult questions on the third pass for which you have a full two hours to ponder the answers. Having this much time to approach your toughest questions is a real stress reliever and a major confidence builder for the exam.

Breathe! Students of yoga have utilized this technique for years. While in a stressed state, the simplest and most effective way to calm your system is by deep controlled breathing. This will produce a calming effect on your mind as well as your body, and can even lower blood pressure. If you feel a moment of

panic during the exam, sit back in your chair, close your eyes and breathe deeply and slowly for 15 to 20 seconds.

## Useful Exam Tips

**Think Like PMI!** When you are answering questions for the exam, unless stated otherwise, assume the following is true:

- You are the customer if procuring services from an external vendor unless stated otherwise
- As the project manager you are in control of the budget, the timeline, and the resources
- The project is of sufficient size to warrant the use of a project management plan and all subsidiary plans
- You are following the formal processes as outlined by PMI®, even if you don't use them in real life
- You have access to historical information and that formal project management processes are followed in your organization

**The exam does not test memorization.** Being a quiz kid with an eidetic memory will not help you pass the *PMP®* examination. You could memorize the *PMBOK® Guide*, 5th edition cover to cover and easily fail the exam. The *PMP®* exam tests your experience as a project manager as well as your understanding of project management concepts, and your ability to correctly analyze situations that occur on projects.

**While some memorization is required it is not the focal point of the examination.**

**Answer all questions.** You do not get any credit for an unanswered question. If you are completely stumped by a question there are only four possible answer alternatives. You have at least a 25% chance of getting it right. If you can eliminate at least two apparently incorrect answers your chances have improved to 50-50. *Always answer a question even if time is running out.*

**Fill in the blanks.** With a fill-in-the-blanks type of question, sometimes the correct answer is not grammatically correct. Don't let that stop you from filling in the correct answer.

**Software calculator.** You will be provided with an online, basic calculator that performs the following functions: add, subtract, multiply, and divide. A TI-83 graphing calculator with sophisticated integral and derivative calculus functions will not be allowed in the exam room.

**Look for sweeping generalizations.** Frequently you will see broad generalizations and questions using terms such as; "MUST, NEVER, ALWAYS, COMPLETELY" or other absolutes. When referring to the project manager's actions, these terms are almost always wrong. Make sure you understand PMI®'s point of view first before attempting to answer questions containing these terms.

**NEXT, BEST, WORST, LEAST, MOST, FIRST, LAST.** On a number of exam questions you will be asked what is the BEST or FIRST action you should take regarding a specific situation. When we see questions like this, it is a tipoff that there is usually more than one correct answer. Read these questions carefully and understand what is being asked.

**Cheerleader answers.** There are a fair number of question responses that are what we call 'cheerleader' answers. Statements such as "quality is really important" or "scope verification is really time consuming" are answer choices that are guaranteed incorrect. Also keep an eye out for answers in which there is some type of emotional response to a situation. Project managers manage projects with data and fact. "Touchy-feely" answers can usually be eliminated immediately from consideration.

**Use the whole exam time.** Allow yourself the full four hours to complete the exam unless the following situation applies: you have answered all the questions and double-checked the answers. Studies have shown that over-thinking answers on an examination will frequently cause test takers to second-guess themselves. More often than not, they will change correct answers to incorrect answers. Your first instinct on a difficult question will generally be correct. If you have used the three-pass method, double-checked your answers, and 30 minutes on the exam remains, your best strategy may simply be to submit your answers for grading.

**Know PMI's recurring themes for the exam.** The following themes need to be well understood to increase your chance of passing the exam the first time:

- The project manager puts the interests of the project ahead of his/her own self-interest
- The project manager is assigned during the Initiating phase of the project
- Organizations have a Project Management Office (PMO), that has clearly defined authority over the implementation of project processes
- The WBS is the foundation for all project management planning
- Stakeholders are engaged throughout the project
- Planning is a key element in all projects
- All roles and responsibilities are clearly defined and documented for the project
- Due to the uniqueness of the project, the project manager focuses on risk identification and risk management
- Project management plans are agreed, realistic and signed off by all relevant stakeholders
- The Project manager is responsible for realistically assessing all time, budget and quality constraints and resolves any issues with the management *prior to* the start of project work
- Continuous process improvement on the project is one of the key responsibilities of the project manager
- The project manager determines the quality metrics to be used on the project
- The project management plan is the key document by which the project is managed
- Projects are continually re-estimated throughout the life of the project so that an accurate budget and timeline may be forecasted
- Progressive elaboration is a key concept used by the project manager to tighten estimates as the project moves forward
- The project manager has authority. The PM can reject changes to scope and control the project budget and timeline for the benefit of the customer
- The PM protects the project from unnecessary changes
- In the event that scope changes must be made, the PM will ensure that a thorough impact assessment will be performed assessing changes to time, budget, resources, risks, quality, and customer satisfaction
- Project managers spend 90% of their time communicating with stakeholders to ensure everyone connected with the project knows what is going on
- Project managers proactively seek out additional risks, problems, and other changes to prevent future problems with the project
- Project managers have a fundamental understanding of contract language
- Project managers ensure organizational policies are followed for the duration of the project
- When closing a project, the project manager archives all project records
- Projects are not considered complete until final acceptance has been received from the customer and the PM releases resources upon project completion

## Maintaining the PMP Certification

Maintaining the PMP® Certification requires the credential holder to document 60 Professional Development Units (PDUs) every three years. This can be accomplished in many ways, including, but not limited to the following:

- Attend a PMI® chapter meeting: 1.5 PDU
- Any PM training from a PMI® Registered Education Provider (REP): 1 PDU per hour of training
- Any PM course offered by an accredited College or University: 1 PDU per hour of training
- Self study
- Speaking, lecturing or publishing articles on any aspect of project management

Consult the PMI® website at [www.pmi.org](http://www.pmi.org) for a comprehensive listing.

### **CRITICAL NOTE:**

Starting August 31, 2011, the exam section concerning Ethics and Professional and Social Responsibility will no longer be tested as a separate entity apart from the five process groups, but will be subsumed within each process group. This means that questions regarding ethics can appear in the Initiating, Planning, Executing, Monitoring and Controlling and Closing process groups.

## In Summary...

- ▶ In this section we covered:
  - ▶ What types of questions to expect on the test
  - ▶ Study and test-taking tips
  - ▶ Requirements necessary to maintain certification

# Chapter 2 : Project Life Cycle and Organization

## Project Management Defined Organizational Influences and Project Life Cycle

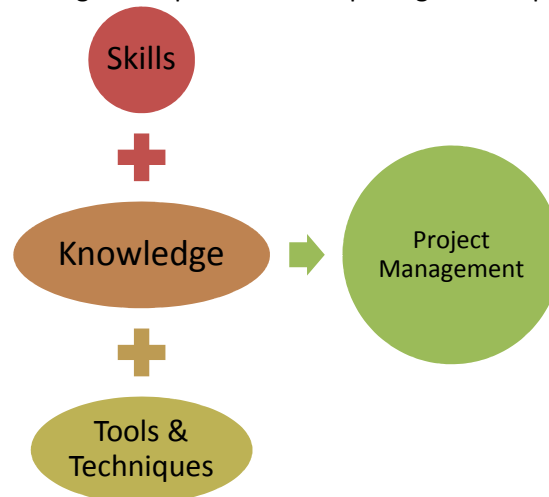
### Section Objectives

- What Is a Project and What Is Project Management?
- The Project Management Life Cycle vs. the Project Life Cycle
- Portfolio Management, Program Management, Project Management, and Organizational Project Management
- Project Management, Operations Management, and Organizational Strategy
- Business Value
- Organizational Influences on Project Management
- Project Stakeholders and Governance
- Project Team
- Project Lifecycle

## Definition of Project Management

According to PMI®, project management is:

- The application of knowledge, skills, tools, and techniques to project activities to meet project requirements
- project management is accomplished through the appropriate application and integration of the 47 logically grouped project management processes comprising the five process groups



The five process groups are, in order:

- Initiating
- Planning
- Executing
- Monitoring and Controlling
- Closing

**Critical Note:** Many organizations implementing the PMI® Project framework in their organizations make the mistake of thinking that the five process groups constitute project phases. They do not. According to PMI®: **"The Process Groups are not project life cycle phases"**<sup>2</sup>

## What Is a Project?

- A Project:
  - A time-scoped/time-boxed activity
  - Has a beginning, middle and an end
  - Creates a unique product, service or result
  - A 'progressive elaboration'
- Operations:
  - Endures for the lifetime of the product, process or service
  - Can be incrementally improved or enhanced over operational lifetime

---

<sup>2</sup>Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p. 52

- Enhancements/improvement typically done as a series of smaller projects

A project as defined by PMI® states the following:

"A Project is a temporary endeavor undertaken to create a unique product, service, or result."  
The project is completed when the objectives have been reached from the customer's perspective, when the project is terminated because its objectives cannot be met, or if the need for the project no longer exists.

The term 'temporary' refers to the execution of the project and not to the *product* of the project, which is usually created to deliver a lasting or sustained outcome. An example of this type of project would be a national coast-to-coast railroad system or a national monument.

The term 'unique' means you are doing something that is without like or equal. This does not mean that every aspect of the project is unique. A project may contain repeating elements such as processes or infrastructural elements.

Operations endure for the lifetime of the *product*. *Operations* address assembly-line type processes that are both predictable and repeatable. *Many projects contain repeatable elements that resemble operational processes.*

**Point of view** is also very important to consider when identifying an operational process or a project. To the customer the work effort may be a project, however to the performing organization the work effort may be purely operational and something they do all the time.

There are distinct similarities between projects and operations:

1. Both are performed by individuals
2. Both are subject to constraints including resources, schedule, risk and others
3. Both are planned, executed and controlled
4. Both are designed to meet organizational and/or strategic objectives

The key differences between projects and operations:

1. The project ends at some point, whereas operations continues for the lifetime of the product
2. The project may contain a number of unknown, unpredictable elements, whereas operational elements are both predictable and repeatable
3. Projects continually evaluate risk, whereas operational processes are usually designed to minimize or eliminate risk. (Operational elements are both predictable and repeatable)

## Project Constraints

There can literally be hundreds of constraints on a project. Constraints are limiting factors that set up boundaries for the project. These boundaries may be necessary for the successful completion of the project, however sometimes boundaries and constraints may severely impact project optimization and ultimately customer satisfaction.



As of the printing of the *PMBOK® Guide*, 5th edition, PMI® has abandoned the pure triple constraint model from previous years (cost-schedule-scope) in favor of a more inclusive definition that focuses on the following key constraints (*PMBOK® Guide*, 5th edition, p. 6):

- Scope
- Quality
- Schedule
- Budget
- Resources
- Risk

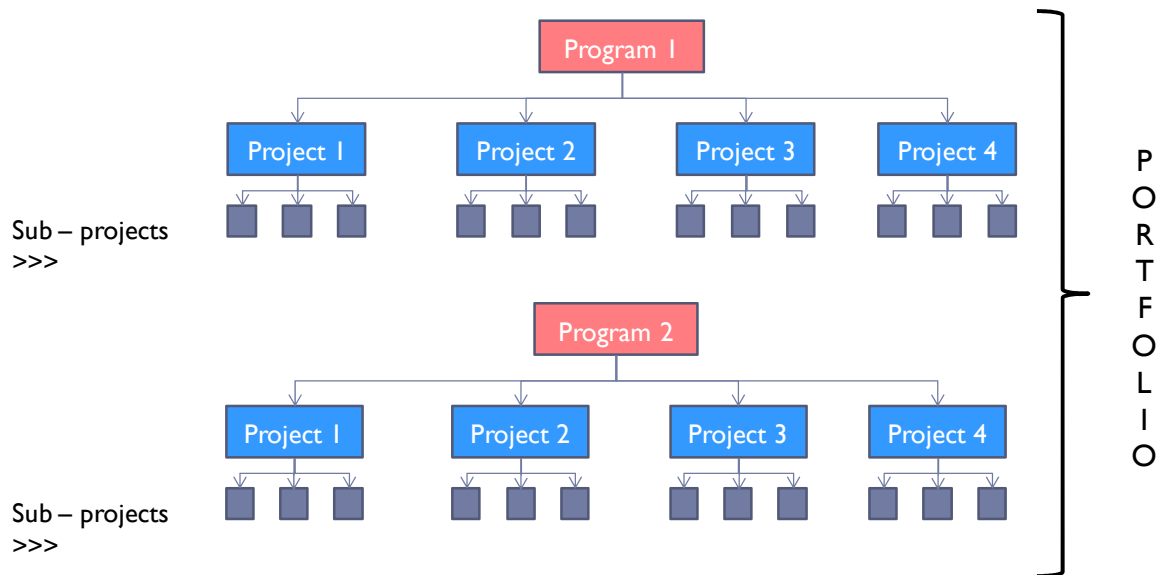


All of the constraints have an impact on customer satisfaction. The project manager is responsible for balancing all the constraints on the project to drive the highest levels of customer satisfaction. Different constraints may come into play at different times in the project, and each of these constraints needs to be evaluated in terms of ultimate customer satisfaction and the needs of the project.

## What Are Programs, Portfolios and Sub-Projects?

- ▶ A Portfolio:
  - ▶ A portfolio is a collection of projects or programs and other work that are grouped together to facilitate effective management of that work to meet strategic business objectives.
  - ▶ The projects or programs in the portfolio may not necessarily be interdependent or directly related

- ▶ A Program:
  - ▶ A program is a group of related projects managed in a coordinated way to obtain benefits and control not available from managing them individually
- ▶ A Project:
  - ▶ A means of achieving the organization's strategic plan
  - ▶ Progressively elaborated
- ▶ A Subproject: Smaller portion of an overall project



A Program is a group of related projects. The purpose in managing a group of projects in this manner is to derive economies of scale, decrease risk and potentially create synergies for improved resource utilization, as well as reduce costs. Programs can also address administrative functions as well as ongoing operational functions.

A Portfolio can include a combination of projects and programs designed to meet the strategic objectives of the organization. The individual projects/programs may not be related to each other from a management perspective. For example, a financial organization may have a portfolio of individual products all relating to wealth building. It may have a different portfolio of products related to risk avoidance/mitigation. Each of the products within these portfolios may have been created through the execution of an individual project or a program. The portfolio helps to group these products in a manner that makes marketing and sales of these products more efficient and comprehensible to the organization's customers.

Subprojects are created by subdividing a larger project into smaller, more manageable pieces or components. This may be useful if the project follows a phase-gate approach to execution in which specific subprojects are completed within each project phase.

## Process Comparisons

The following diagram displays the differences between portfolios, programs and projects:

	PROJECTS	PROGRAMS	PORTFOLIOS
Scope	Projects have defined objectives. Scope is progressively elaborated	Larger Scope. More Benefits	Portfolios scope changes with the strategic goals of the business.
Change	Project managers expect change and manage and control it.	Program managers expect change from inside/outside the program, and manage and control it.	Portfolio managers monitor changes in the environment.
Planning	PMs progressively elaborate high level information into detailed plans throughout the project lifecycle.	PgMs develop overall program plan and high level plans; guide detail planning at the component level.	Portfolio managers create/maintain processes for the aggregate portfolio.
Management	PMs manage the project team to meet project objectives.	PgMs manage program staff and project managers. Provide vision and overall leadership.	Portfolio managers manage or coordinate portfolio management staff.
Success	Success is measured by product and project quality, timeliness, budget compliance and customer satisfaction.	Success is measured by the degree to which program satisfies needs for which it was undertaken.	Success is measured by the aggregate performance of the portfolio components.
Monitoring	PMs monitor and control the work of producing the products.	PgMs monitor program components to insure goals, schedule, budget and benefits are met.	Portfolio manager monitor aggregate performance and value indicators..

From PMBOK® Guide, 5<sup>th</sup> edition

3

## The PMO

The purpose of the PMO - Project Management Office - is to centralize the management of projects across the organization. Typically the PMO will provide one or all of the following for a project:

- Methods and procedures, templates, methodologies and policies for managing projects
- Guidance and training to the organization on project management concepts, principles, and how to manage projects within the organization
- A resource pool of project managers for various organizational initiatives

Depending on your organizational structure the PMO may play the following roles in your organization:

- Audit compliance with Project policies, standards, and procedures companywide
- Help to provide project resources
- Cancel projects
- Provide templates and standardized forms for project use
- Offer coaching, training and mentoring for project managers
- Serve as a centralized communications conduit for projects
- Manage dependencies between projects, programs, or portfolios
- Function as a stakeholder

<sup>3</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p. 8

## Types of PMOs

- ▶ **Supportive:** provides support in the form of on-demand expertise, templates, best practices, access to information and expertise on other projects.
- ▶ **Controlling:** requires that support be used. Requirements might include adoption of specific methodologies, templates, forms, conformance to governance, and application of other PMO controlled sets of rules.
- ▶ **Directive:** "takes over" the projects by providing the project management experience and resources to manage the project

PMI® defines three types of PMO's for the organization; supportive, controlling, and directive, all briefly defined above. The idea of the PMO is to integrate data and information from corporate strategic project and evaluate how the high-level strategic objectives are being fulfilled. Thus, the PMO is a liaison between the organization's portfolios, programs, projects and the corporate measurement system.

One of the key functions of the PMO is to support project managers which can include any or all of the following:

- Managing shared resources across projects administered by the PMO
- Identifying/developing project management methodology, best practices, and standards
- Coaching mentoring, training, and oversight
- Monitoring compliance with project management standards, policies, procedures, and templates via a project audit
- Developing/managing project policies, procedures, templates, and shared documentation
- Coordinating communication across projects

## Project Management, Operations Management and Organizational Strategy

While operations management is outside the scope of formal project management, projects can intersect with operations at various points in the product lifecycle, for example:

- At each closeout phase in the project
- Developing a new product, upgrading a product, or expanding outputs
- Improving operations of the product development process
- Until the end of the product lifecycle

Operational stakeholders may impact/be impacted by the project and are best included in the stakeholder register, and their influence can be addressed as part of the risk management plan.

## Organizations and Project Management

Organizations utilize governance to establish strategic direction, guide the pursuits of the business and align with business objectives. Therefore, if there is a change in the business environment, project objectives need to be re-aligned.

While many organizations implement projects to achieve specific goals, there are some organizations whose work is project-based. These organizations are known as PBO's or project based organizations. The general characteristics of a PBO are outlined below:

- Can exist in functional, matrix, or projectized organizations
- Can diminish hierarchy and bureaucracy inside the organization because work is measured by result rather than by position or politics
- PBO's can reference the entire company, a multi-firm consortium, or a network

The link between project management and organizational governance can be summarized in the following statement; the project may be judged on the basis of how well the delivered product or service supports organizational governance. Therefore, it is critical that the project manager be knowledgeable about organizational governance policies that relate to the product or service as well as sustainability requirements as they relate to project deliverables.

Ultimately, the organizational strategy should provide guidance and direction to the project management process. If the project manager observes that the goals of a project are in conflict with established organizational strategy, it is the project manager's job to document and identify these conflicts as early in the project lifecycle as possible

## Business Value

PMI® defines business value as the "entire value of the business; the total sum of all tangible and intangible elements".<sup>4</sup> Therefore, successful business value realization is a combination of strategic planning and effective management. Bridging the gap between organizational strategy and successful business value realization requires the use of portfolio, program, and project management techniques:

- Portfolio management aligns projects programs and/or operations to the organizational strategy
- Program management aligns multiple project for optimize and/or integrated cost, schedule, effort, and benefits
- Project management enables the organization to apply knowledge, processes, skills, and tools to enhance the likelihood of success over a wide range of projects. Projects are means of achieving organizational strategy and objectives

---

<sup>4</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p. 41

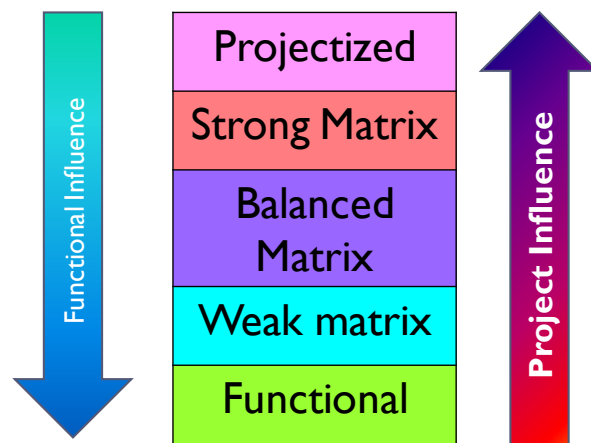
## The Project Manager's Role

The project manager is assigned by the organization to achieve the project objectives. Depending upon the organizational structure, the project manager may report to a functional manager or an operations manager. In other situations the project manager may report to a program manager or a portfolio manager who is responsible for enterprise-wide projects and programs.

While the project manager is responsible for applying the correct tools and techniques to ensure the success of the project, effective project management requires that the project manager also possess the following characteristics:

1. **Knowledge.** What the project manager knows about project management
2. **Performance.** What the Project manager is able to accomplish while applying project management knowledge
3. **Personal.** How the project manager behaves when performing project related activities. The personal effectiveness of the project manager consists of personality characteristics, leadership ability, problem solving skills, attitude, and the ability to guide the project team while achieving project objectives and balancing project constraints

## Organizational Influences on Project Management



Different types of organizational structures will have a positive or negative effect on the effectiveness of project management in your organization.

There are three fundamental organizational structures that you need to know for the exam:

- Functional
- Matrix (Weak, Balanced, Strong)
- Projectized

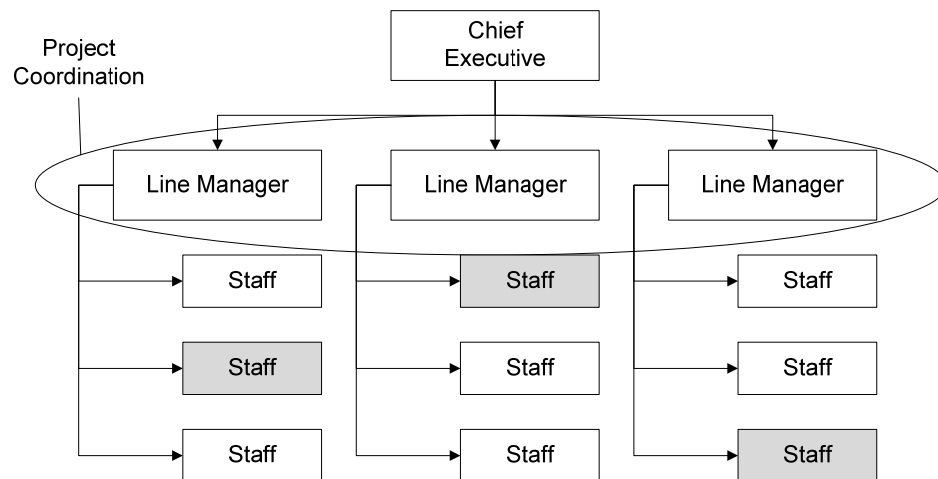
The influence of functional organizations in which project resources report to line managers or senior managers, impact the project manager's ability to influence the successful execution of the project.

In a Projectized organization project manager has ultimate authority over time, schedule, resources, and every other aspect of the project.

In a matrix organization project manager shares responsibility to a greater or lesser degree with line managers or senior managers when it comes to managing project elements such as budget, timeline, resource availability, communications and others.

An organization that uses a combination of organizational structures is called a "composite organization".

## Functional Organizations



Gray boxes correspond to staff performing project activities

Drawing based on *PMBOK® Guide*, 5th edition<sup>5</sup>

In this organization type, the project manager has little to no authority on the project. Usually the project manager is part time and is often referenced as a 'project expeditor' or 'project coordinator'. The functional hierarchy is that all the team resources report to a functional or line manager. The project manager has little or no input into performance reviews of the project team and frequently must approach functional managers 'hat in hand' to make the best case they can for project resources.

### ► Exam Tip:

- **Project** \_\_\_\_\_ is an assistant that cannot make or enforce decisions
- **Project** \_\_\_\_\_ have some decision making authority

<sup>5</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p. 29

Each of these designations can be found in a weak matrix organization as well<sup>6</sup>

## Functional Advantages and Disadvantages

- **Advantages**
  - Clearly defined career paths
  - Familiar structure
  - Direct supervisor reporting structure
  - Employees are experts
- **Disadvantages**
  - Employee's job difficult to change
  - Much contention for resources and project priority
  - Performance reviews and promotions are functional manager responsibility
  - PM has little or no authority
  - PM usually part time - no clearly defined career path for the PM

You'll notice from looking at the list above that with the functional approach to managing projects, the disadvantages clearly outnumber the advantages.

As the project manager in this type of environment, ensure that you have a very clear understanding of the structural hierarchy of the organization and that you work within the bounds of the tools that the organization has left at your disposal (generally few to none).

## The Matrixed Organization

The matrixed organization was developed in the 1970s to attempt to combine the advantages of both the functional and the Projectized organization while minimizing the disadvantages. There are three types of matrixed organizations that PMI® has defined:

- **Weak matrix.** Similar to the functional organization in that project resources report directly to functional managers
- **Balanced matrix.** With this organization type, project power and influence is shared between the project manager and the functional manager
- **Strong matrix.** Here most of the project authority is similar to the projectized organization in that the project manager has almost complete control of project resources, budget, timeline, quality, and customer satisfaction

**Exam Tip: you may see the term 'tight matrix' on an exam question. A tight matrix simply means that the offices for the project team are co-located in the same room.**

---

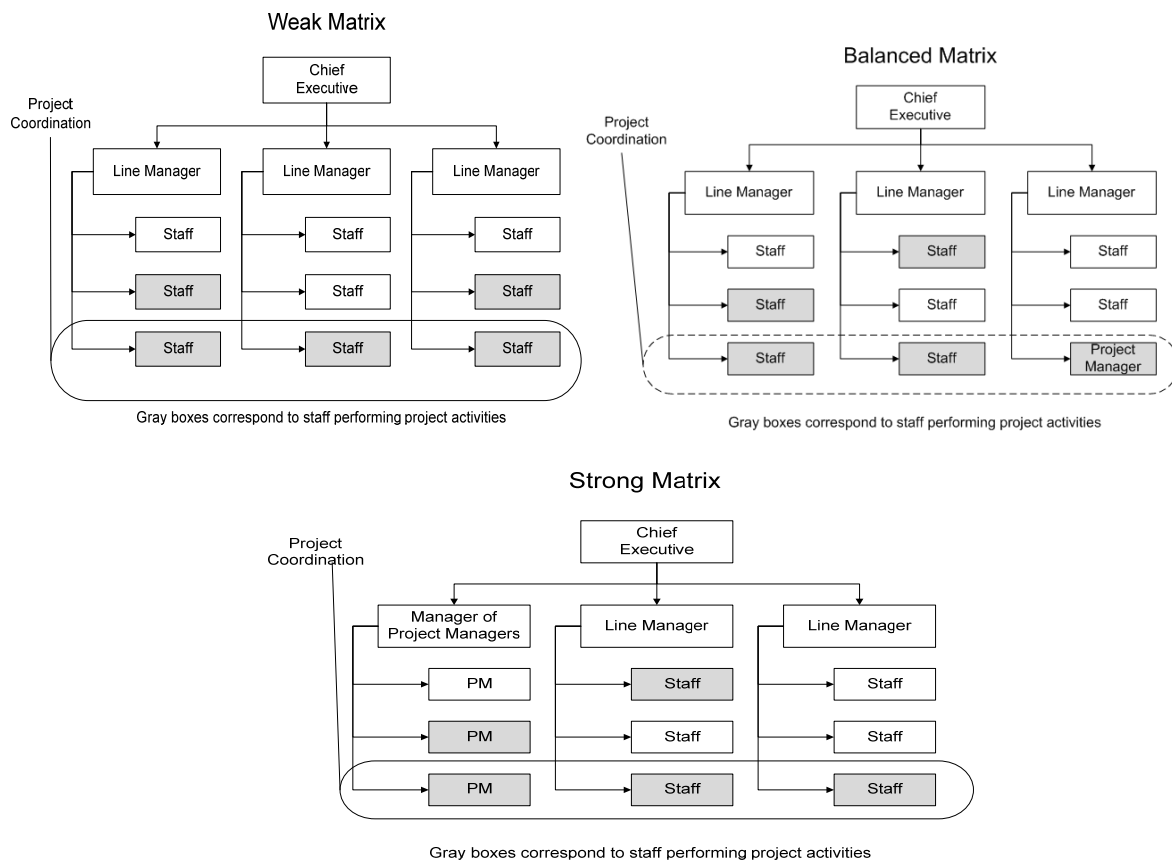
<sup>6</sup> "Weak matrices maintain many of the characteristics of a functional organization, and the role of the project manager is more of a coordinator or expeditor..." **Project Management Institute, A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition, Project Management Institute, Inc., 2013, p. 23**



## Matrixed Advantages and Disadvantages

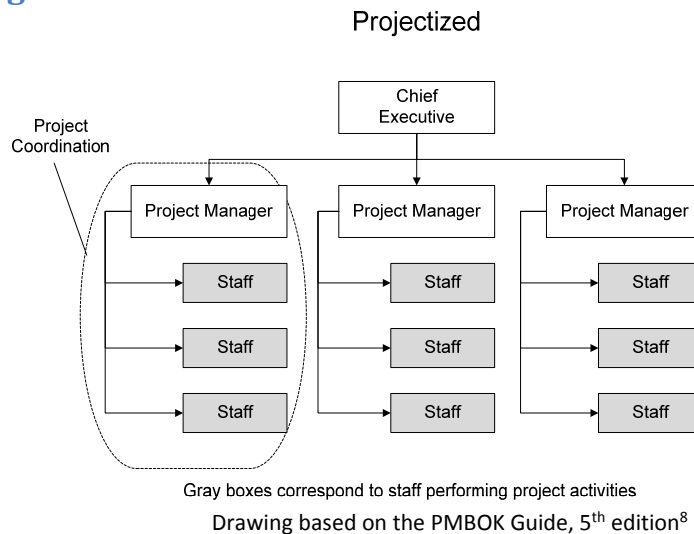
- **Advantages:**
  - Objectives remain visible
  - Increased support from functional managers
  - Increased control by project manager
  - Improved flexibility
  - Job remains after project is complete
  - Multiple inputs on team members' performance
- **Disadvantages:**
  - Multiple bosses
  - Adds complexity
  - Additional policies and procedures are necessary
  - Different priorities or objectives may exist

Notice that in a matrix environment, the advantages outnumber the disadvantages. As with the other organizational types, you may be asked questions on the exam regarding the advantages and disadvantages of working in one of the matrixed environments. Some graphical examples of matrix organizations appear below (Drawings based on *PMBOK® Guide*, 5th edition<sup>7</sup>):



<sup>7</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, pp. 23-24

## Projectized Organizations



The projectized organization is one that derives its primary income from delivering projects. In this organization, the project manager has ultimate authority over the project, including the timeline, the budget, the resources, the scope, the quality and, ultimately, customer satisfaction.

In this environment the project resources are dedicated 100% to working on projects and focused on the project at hand. This approach is effective when the project is very high priority and requires the dedicated focus of everyone on the team. Typically, very large and complex projects are executed in a projectized environment.

### Projectized Advantages and Disadvantages

- Advantages:
  - Dedicated project focus
  - Project loyalty
  - Efficient project organization
  - Efficient project communication
- Disadvantages:
  - Job is gone once project is complete
  - Resources are siloed rather than shared
  - Job functions and facilities can be duplicated

For the exam, the above outlined advantages and disadvantages need to be understood, as exam questions may make oblique references to the Projectized (or any other) organization type.

Example:

You are a project manager in which you have ultimate authority over the project, including the budget, the timeline, and the resources. While this dedicated focus serves the needs of the project, there may

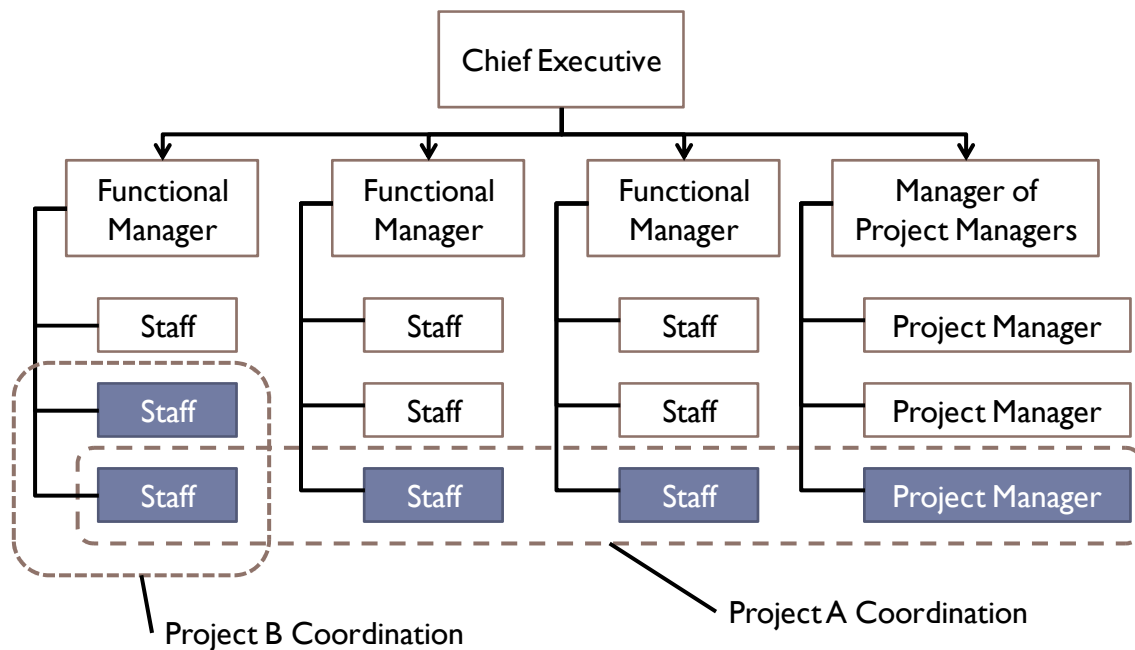
<sup>8</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p. 25

be a disadvantage in approaching a project in this way. Which of the following would be the BIGGEST disadvantage using this approach?

- a. As the project manager, you get all the pressure
- b. Line managers may not respect your authority
- c. Your job may be gone once the project ends
- d. Negotiating conflicting stakeholder needs is more difficult

A clear reading of the question describes a projectized organization type. Based on your understanding of the Projectized organization, you also understand the disadvantages of executing a project in this organizational environment.

## Composite Organizations



Based on the *PMBOK® Guide*, 5<sup>th</sup> edition<sup>9</sup>

The composite organization consists of elements of functional, matrix, and projectized organizations in that a project can be approached using any one of the three aforementioned methods. Depending on the complexity of the project, the organization may use all three approaches on the same project.

Since projects can include strategic, middle management, and operational levels, the project manager may interact with all three levels depending on:

<sup>9</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p. 26

- Strategic importance of the project
- Ability of stakeholders to exert influence on the project
- Degree of project management maturity
- Project management systems
- Organizational communications

This interaction can determine project characteristics including; project managers level of authority, resource availability, who controls the project budget, project manager's role, and project team composition.

## What Is Your Organizational Structure?

Project characteristics Organization structure	Functional	Matrixed Organizations			Projectized
		Weak Matrix	Balanced Matrix	Strong Matrix	
<b>Project Manager's Authority</b>	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total
<b>Resource Availability</b>	Little or None	Limited	Low to Moderate	Moderate to High	High to Almost Total
<b>Who controls the project budget</b>	Functional Manager	Functional Manager	Mixed	Project Manager	Project Manager
<b>Project Manager's Role</b>	Part-time	Part-time	Full-time	Full-time	Full-time
<b>Project Management Administrative Staff</b>	Part-time	Part-time	Part-time	Full-time	Full-time

Drawing based on *PMBOK® Guide*, 5th edition<sup>10</sup>

The chart above summarizes the functional, matrix and projectized organizations.

**Exam Tip:** For the purposes of the exam assume that you are working in a strong matrix environment unless the question explicitly (or implicitly) states otherwise.

For the exam, you would do well to commit the above chart to memory.

## Organizational Process Assets

Organizational process assets include plans, processes, policies, procedures, and knowledge bases used by the performing organization to execute projects. These assets can include formal plans, informal plans, lessons learned, historical information, completed schedules risk data and earned value data. Organizational process assets are inputs to most planning processes. By process group, organizational process assets may include the following:

<sup>10</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p. 22

- Initiating and planning:
  - Guidelines and criteria for tailoring organizational standard processes to project needs
  - Internal organizational standards such as policies, product and project life cycles, and quality policies and procedures
  - Templates (E. G. Risk register, work breakdown structure, network diagrams, etc.)
- Executing, Monitoring and Controlling:
  - Change control procedures, how standards, policies, plans and procedures will be modified, and how changes will be approved and validated
  - Financial controls
  - Issue and defect management procedures
  - Organizational communications requirements
  - Prioritizing, approving, and issuing work authorizations
  - Risk control procedures
  - Standardized guidelines which can include work instructions, proposal evaluation criteria, and performance measurement criteria
- Closing:
  - Project closure guidelines or requirements

**Exam Tip:** all of the above can be contained in the corporate knowledge base

## Enterprise Environmental Factors

Enterprise Environmental Factors (EEF) are a recurring input to over 20 of the processes primarily in the Planning Process Group. These elements refer to conditions not under control of the project team that influence, constrain or direct the project. Their influence may have a positive or negative effect on the project's outcome. The key elements involving enterprise environmental factors include:

- Organizational culture and structure
- Government and industry standards
- Existing human resources
- Personnel administration
- **Company work authorization system\***
- Marketplace conditions
- Stakeholder risk tolerances
- Commercial databases
- \_\_\_\_\_ e.g., an automated tool suite, such as a scheduling software tool, a configuration management system, an information collection and distribution system, or web interfaces to other online automated systems).

**\*Exam Tip:** A work authorization system is designed to ensure that work is approved before it begins, and to ensure the work is done at the right time and in the correct sequence. Use of a work authorization system also helps to prevent scope creep as well as goldplating.

## Understanding Stakeholder Needs

A stakeholder:

1. Anyone who is positively or negatively impacted by the project
2. Anyone who can exert influence over the project's objectives and outcomes.

Typical key stakeholders can include, but are not limited to:

- **Project manager**
- **Customer/user**
- **Performing organization**
- **Project team members**
- **Project management team**
- **Sponsor**
- **Functional/Senior Manager**
- **Operations**
- **Business partners**
- **Influencers**
- **PMO**
- **The public**

To iterate, a project stakeholder is anyone who can be positively or negatively impacted by the results of the project. As such, it is the job of the project manager to balance stakeholder needs while delivering the project's product. The project manager may have to deal with the following when addressing stakeholder needs:

- Conflicting stakeholder needs or interests
- Stakeholder disagreement regarding the product of the project
- Different communication needs from stakeholder to stakeholder
- Varying levels of stakeholder influence

It is the project manager's responsibility to identify all potential stakeholders on a project and make sure that they are treated as members of the project team. Failure to do so can sink your project late in the game. Taking the effort to determine stakeholder likes, dislikes, hot buttons, critical needs and influence can pay huge dividends for your project as it progresses.

Stakeholder identification is also a continuous process in that different stakeholders may be impacted at various phases of the project. Testing resources will have more of an impact or influence later in your project than they will near the beginning of your project when an initial high level design is being created.

## Project Governance

Project governance is an oversight function that encompasses the project lifecycle. It provides the project manager and the project team with structure, processes, and decision-making models and tools for managing the project. It includes a framework for making project decisions, defining roles and responsibilities, and accountabilities for project success and determines the effectiveness of the project manager. The PMO may play some decisive role in project governance, and the governance framework may include any or all of the following elements:

- Deliverable acceptance criteria
- Escalation process for resolving issues during the project
- Relationship between the project team, organizational groups, and external stakeholders
- Project Org chart
- Processes for project communications
- Decision making processes for the project
- Aligning project governance and organizational strategy
- Project lifecycle approach
- Process for phase reviews
- Process for review and approval of project changes (I. E. Budget, scope, quality, schedule)
- Process for aligning internal stakeholders with Project process requirements

## The Project Team

The project team includes the project manager and the resources who act together performing the work of the project to achieve its objectives. The project team can include but is not limited to the following:

- Project Management Staff: team members to perform project management activities
- Project Staff: team members to carry out the work of the project
- Supporting Experts: subject matter experts needed to help develop or execute the project management plan
- User or Customer Representatives: members who will accept deliverables or the product of the project
- Sellers: contracted organizations that provide components or services for the project
- Business Partners or Business Partner Members: external companies that have a relationship with the enterprise providing specialized skills or roles for the project

The composition of the project team will vary based on factors relating to organizational culture, scope, or location. The relationship between the project manager and the team can vary depending on the authority of the project manager; the project manager may be the team's line manager or may have little or no direct organizational authority over the team members. Basic team compositions consist of one of the following:

- Dedicated: team members are assigned to work full-time on the project. In this case the project team is usually co-located and reports directly to the project manager
- Part-Time: team members are assigned to projects to accomplish temporary additional work. As a result, the functional manager usually maintain control over the team members and the

resources allocated to the project. In this case, part-time team members may be assigned more than one project at a time

**Exam Tip:** dedicated and part-time project team members can exist in any of the organizational structures: functional, matrix, projectized, or composite.

## The Project Life Cycle

- “The project life cycle can be determined or shaped by the unique aspects of the organization...While every project has a definite start and a definite end, the specific deliverables and activities...will vary widely with the project”<sup>11</sup>
- The **phases** of a software project life cycle will differ from a construction project life cycle or a pharmaceutical drug development life cycle

Project life cycles are as unique as the industries they serve. Projects are generally broken into phases which are used to control project execution and ensure its success. Within an organization it is not uncommon to find established policies that standardize projects around a specific methodology or project approach. Other organizations may allow the project team to organize around the most appropriate approach for their individual project. Regardless of the approach taken by the organization there is no standard project life cycle that fits all organizations. It is truly a case of 'one size fits none'.

Organizational governance across the project life cycle must provide a consistent method for controlling the project and ensuring success. The phase structure provides a formal basis for such control. At the completion of each phase, a management review or 'decision gate' is executed to determine whether the project can continue, needs further adjustments, or should be canceled.

Thus a phase-end review can achieve two goals for the project:

- Authorization to close the current project phase
- Authorization to initiate the subsequent project phase

Implementing a project phase structure in a project can deliver the following benefits:

- Breaking down the work into smaller chunks enables more accurate budget and timeline estimates
- A phase structure can help prevent scope creep

## Phase-to-Phase Relationships

As of this writing, PMI® has elaborated two fundamental phase-to-phase relationships are contained within the project life cycle. These phases are described as follows:

---

<sup>1111</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013. P. 38



- *Sequential Relationship*. This describes the traditional finish-to-start relationship. Phase 1 must be completed before phase 2 can begin. Traditional construction projects frequently use the sequential phase relationship when constructing a house or an office building.
- *Overlapping Relationship*. In this case, a subsequent phase can begin before the previous phase has completed. Stated differently, phase 2 can start before phase 1 is done. This technique allows for schedule compression called fast tracking, and overall reduction of the timeline of the project. This approach can increase risk and rework - interdependencies between the phases must be managed diligently to avoid risk and rework.

Graphic representations of the two types are shown below:

## Sequential:



## Overlapping:



## Project Lifecycle Concepts

PMI® has identified three distinct lifecycle concepts in the fifth edition of the PMBOK *Guide*®:

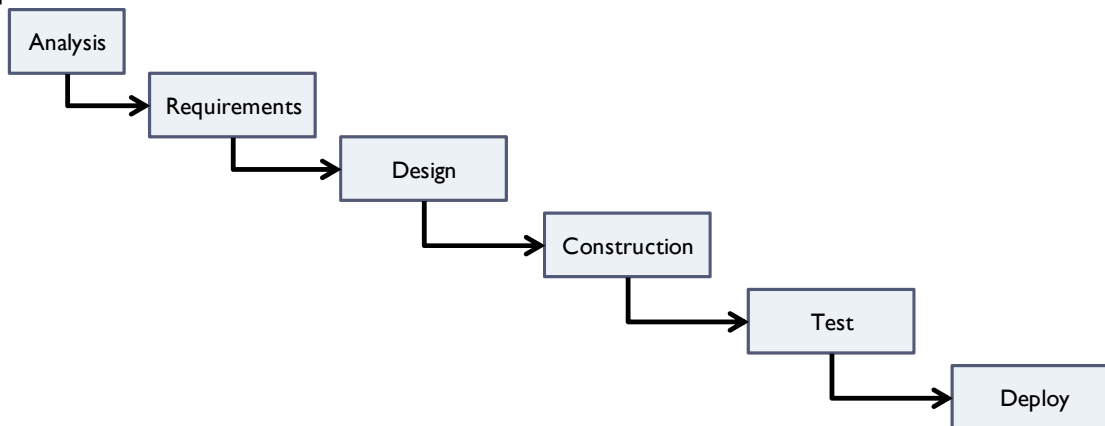
- **Predictive**
- **Iterative**
- **Adaptive**

A description of each type follows below.

### **Predictive**

A predictive lifecycle is also known as a 'plan driven' or 'waterfall' approach to delivering the scope of the project. In this approach, the scope, time, and cost required to deliver that scope are determined as early in the project lifecycle as possible. As a result the project can proceed to a series of sequential or

overlapping phases with each phase focusing on delivering a subset of the project's deliverables. The work in each phase is different in preceding or subsequent phases, therefore, the skill sets required of the project team may vary from phase to phase. The following graphic represents a typical waterfall implementation:



### **Iterative**

With an iterative or incremental lifecycle, project phases are intentionally repeated as the team's understanding of the product increases. The product is developed through a series of repeated cycles while the product incrementally grows at the completion of each iteration. Each iteration incrementally builds on the deliverables from the previous iterations until the exit criteria for the project are met. As a result, the work required for a given set of deliverables may vary in duration and effort. This approach is similar to PMI®'s concept of rolling wave planning: the immediate work for the current iteration is highly detailed, whereas work plans for an iteration several increments into the future may only be developed at a high level.

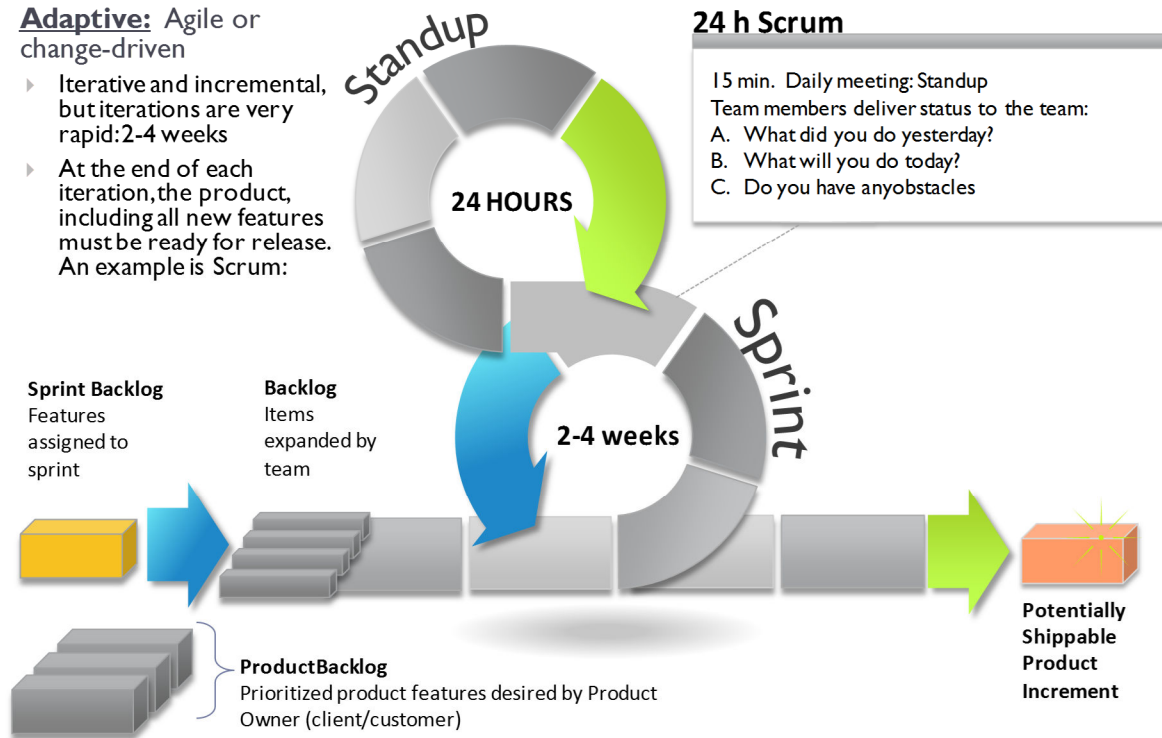
### **Adaptive**

The adaptive lifecycle, also known as 'change driven' or 'agile' is designed to address high levels of change, risk, and/or uncertainty in a project. Agile projects are also incremental and iterative, but with the singular difference that the iterations are generally very short term; usually 2 to 4 weeks. Once a Project iteration length is selected for a project it remains consistent throughout the project. The overall scope of the work is decomposed into an element called a product backlog. The product owner, or business representative, collaborates with the performing organization to prioritize the product backlog and is ultimately responsible for deciding what gets developed and in what sequence.

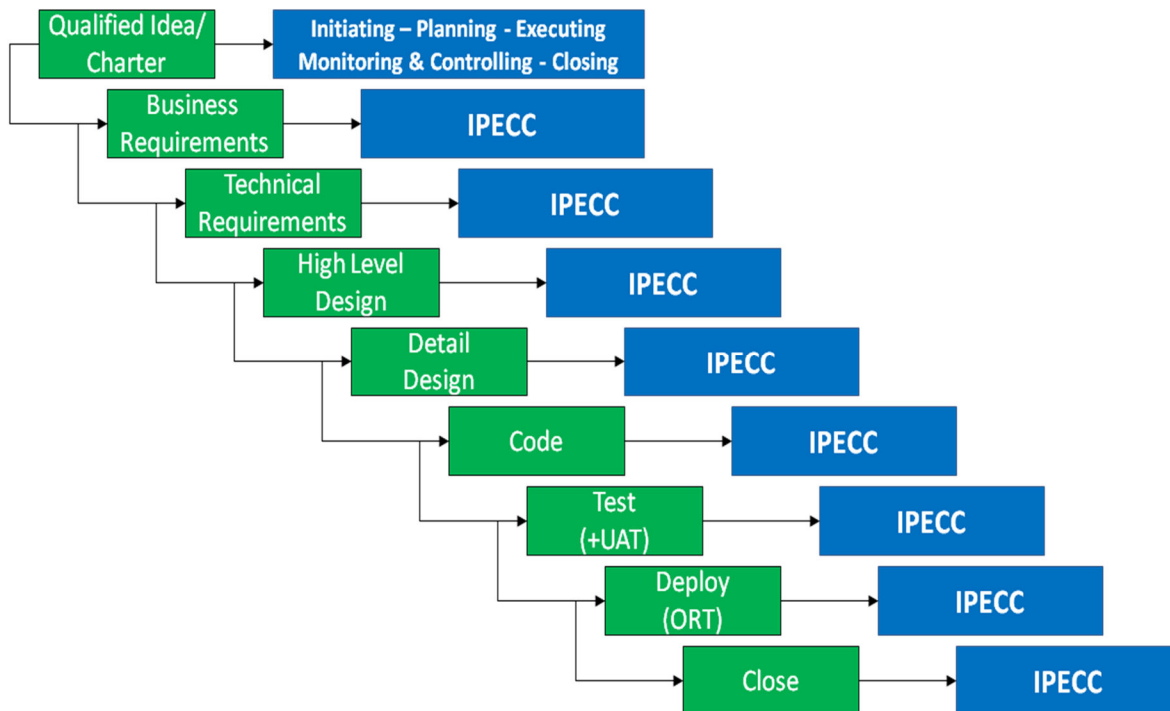
In an adaptive cycle, the project team delivers an increment of the product to production standards, also known as a 'potentially shippable product increment' which is submitted to the customer for review and acceptance. Incomplete or defective features are not accepted for signoff at an iteration-end review. One of the most effective agile methods currently used in the project management space is known as Scrum, a graphic of which appears below:

► **Adaptive:** Agile or change-driven

- Iterative and incremental, but iterations are very rapid: 2-4 weeks
- At the end of each iteration, the product, including all new features must be ready for release. An example is Scrum:



## The Project Life Cycle Versus the Project Management Life cycle



The example shown above does not need to be memorized. It demonstrates the difference between a specific project lifecycle and the processes contained in the Project Management Lifecycle. The IPECC acronym represents the five process groups.

The distinction between the *project management life cycle* versus the *project life cycle* is this:

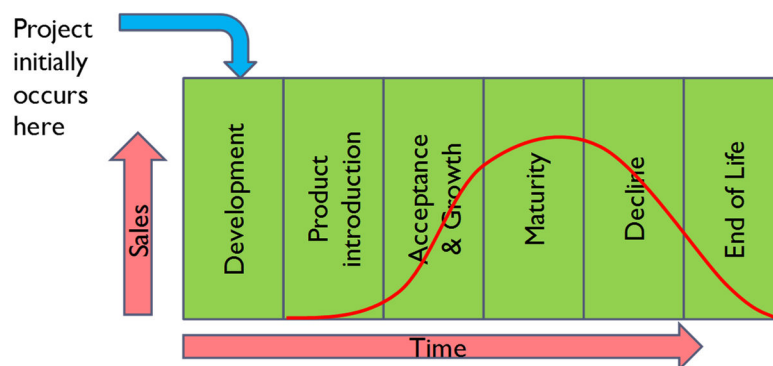
1. The project life cycle is frequently unique to each organization and industry. While there may be similarities between project life cycles, you will see distinct differences between a project life cycle for a construction project, a software project, an energy project, an airline project, a pharmaceutical project, etc. The clear distinction is this; while project life cycles may vary industry to industry,
2. The Project Management Life Cycle is immutable and always consists of the following five process groups:
  - **I**nitiating
  - **P**lanning
  - **E**xecuting
  - Monitoring and **C**ontrolling
  - **C**losing

The five process groups are applied to each phase in the project. *This means that no matter what project life cycle or phase structure you may use for your project, the five project management process groups will be executed within each phase of your project.* (PMBOK® Guide, 5th edition, p. 41, 43).

For example: You will **initiate** a phase, **plan** the work of the phase, **execute** the work of the phase, **monitor and control** the work as it is being executed for the phase, and finally you will **close** the phase or the project. Closing a phase includes a process called 'lessons learned' in which we identify what's working, what's not working, where we can improve, what puzzles us, etc. This lessons-learned process is applied at the completion of every phase of your project.

The figure above shows a generic software development life cycle. Notice that for each phase of the software development life cycle we execute the process groups defined in the project management life cycle: initiating, planning, executing, monitoring and controlling, and closing.

## Defining the Product Life Cycle



- Endures for the life of the product
- A *project* may have been implemented to create to product
- Many smaller projects may be implemented to incrementally improve the product

The **product** is what is created as a result of executing a **project**. When we talk about project management what we are talking about is the work that is being done in the project to produce and deliver the product of the project.

While your project may have taken two years to deliver its product, the product may have a much longer lifetime. As the product grows and matures, a series of smaller projects may be implemented to enhance, improve or change the product over time. Each of these smaller projects is in support of the product and ensuring its longevity in the marketplace.

However, just as a product may have been an ideal solution at one fixed point in time, the need for the product may have deteriorated significantly over the years. The Ford Model-T was at one point, an optimal solution for a specific transportation problem. Today the model-T is considered a quaint antique compared to the vehicles available today. The wood-burning/coal-burning locomotive at one point was an optimal solution for railroad transportation. Today, the use of diesel and electric engines has rendered the wood-burning/coal-burning locomotive obsolete.

Defining the product life cycle is important because from a strategic perspective, the organization must determine when it is of no use to the organization to utilize resources and funds to improve a product that is essentially at the end of its lifetime.

We will address stakeholder management more completely in the Stakeholder Management chapter.

## MBO, OPM3™ and Progressive Elaboration

Management by Objectives (MBO) is a term that was first introduced by Peter Drucker in his 1954 book 'The Practice of Management'.

**Exam Tip:** MBO will only work if it is supported by management.

**OPM3™**- the Organizational Project Management Maturity Model. The model was based on the Software Engineering Institute's Capability Maturity Model Integration (CMMI) for software. OPM3™ helps organizations determine their level of maturity in project management.

**Progressive Elaboration** - this concept is *key* to the entire PMI® framework. It fundamentally states that you cannot come up with a definitive estimate for timeline and budget at the very start of a project. Why? The reason is that there are many unknowns and very little analysis has been done at the beginning of the project. As the project team dives into the analysis, consults with subject matter experts, and begins to define the details of the project - only then can more accurate estimates be created.

The greater the number of the unknowns that exist in a project, the more a progressive elaboration is required to ensure project success.

## Section Review:

- ▶ Definition of PM terms, such as project, PMO, stakeholder, project life cycle, product life cycle, project management life cycle, project management system
- ▶ The role of the project manager
- ▶ Definition of project constraints
- ▶ Project phase concepts
- ▶ Advantages and disadvantages of different organizational structures

## Chapter Two Memory Check

1. A project is \_\_\_\_\_, \_\_\_\_\_ and delivers a \_\_\_\_\_, \_\_\_\_\_ or \_\_\_\_\_
2. Three key constraints on a project are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ as well as quality, resources and risk
3. Three key characteristics of the project manager include; \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ effectiveness
4. A \_\_\_\_\_ is a group of related projects. A \_\_\_\_\_ can be a collection of projects, programs or sub-projects
5. A \_\_\_\_\_ centralizes and co-ordinates the management of portfolios, programs and projects
6. The \_\_\_\_\_ life cycle deals with the work done to accomplish the goals of the project, while the \_\_\_\_\_ life cycle deals with the lifetime of the deliverable(s)
7. The two categories of multi-phase project types are; \_\_\_\_\_, and \_\_\_\_\_
8. A stakeholder is anyone who is \_\_\_\_\_ or \_\_\_\_\_ impacted by the project
9. The four basic organizational types are; \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_
10. The term used to describe the process of delivering more accurate estimates for time and budget as the project progresses is called \_\_\_\_\_
11. Clearly defined career paths and little PM authority describe an advantage and a disadvantage of a \_\_\_\_\_ organization
12. Project loyalty and the possibility of not having a job after the project completes describes an advantage and a disadvantage of a \_\_\_\_\_ organization
13. Increased PM control and multiple bosses describes an advantage and a disadvantage of a \_\_\_\_\_ organization
14. A project \_\_\_\_\_ has very little decision making authority on a project, whereas the project \_\_\_\_\_ has some decision making authority
15. The three types of matrixed organizations are referred to as: \_\_\_\_\_ matrix, \_\_\_\_\_ matrix and \_\_\_\_\_ matrix
16. The three type of project lifecycles defined by PMI® are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_
17. Three types of PMOs defined by PMI® are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_

## Chapter 2 Test

1. The five process groups of the Project Management Life cycle are, in order:
  - a. Initiating, Executing, Planning, Monitor and Control, Closing
  - b. Initiating, Analyzing, Designing, Executing, Closing
  - c. Initiating, Planning, Executing, Monitoring and Controlling, Closing
  - d. Initiating, Planning, Monitoring and Controlling, Validating, Closing
2. You have just started a new position as a project manager with your new company. Upon starting your job you are informed by the line manager that all budgetary decisions rest with her and that all key project decisions will be her responsibility as well. Most likely, PMI® would say you are functioning as a \_\_\_\_\_?
  - a. Resource coordinator
  - b. Project manager
  - c. Functional expediter
  - d. Project coordinator
3. The project manager that you just hired said that she came from a Projectized organization prior to working for your company. Your VP just asked you what that means in terms of her level of authority. You responded:
  - a. she had responsibility for the project but not for the budget
  - b. she had little responsibility for the project or the budget
  - c. she split the project and budget responsibilities with the functional manager
  - d. she was responsible for the budget and the project almost 100%
4. The company you are working for has decided to adopt Scrum as a project management method. You've never heard of Scrum before but decide to do some research and discover that Scrum is an agile method. What kind of project phase method is being adopted here?
  - a. Iterative
  - b. Sequential
  - c. Overlapping
  - d. Phase-neutral
5. Two junior project managers who are working on the same project are having a heated discussion(an argument) on the difference between the project management life cycle and the project life cycle. The first project manager is saying there is essentially no difference between the two while the second project manager is saying that there is a significant difference between the two. While this debate is occurring, a senior vice president from your division interrupts the two and asks them the following question: "When the project is completed what is the expected lifetime of the deliverable?" Essentially, what is the vice president asking them?
  - a. He is asking about the status of the project life cycle
  - b. He is asking about the status of the project management life cycle
  - c. He is asking about the status of the product
  - d. He is trying to determine if they understand life cycle costing
6. What is the *BEST* definition for a project manager's role on the project?
  - a. Take instruction and direction from functional managers
  - b. Assigned by the organization to achieve project objectives
  - c. Balance stakeholder interests on the project
  - d. Effectively manage the project team while also being an expert technical resource



7. Your project team has been assigned to work full-time on your current project. In terms of project team composition, this is best described as a \_\_\_\_\_ project team.
- Projectized
  - Composite
  - Focused
  - Dedicated
8. You have just gotten a new job within an organization that can't spell 'project management' much less figure out how to run a project. Their project management process has been described by some in the organization as an 'adrenaline pounding thrill-ride usually resulting in a train wreck'. At your project kickoff meeting a number of the team members have expressed dismay at how the last project was managed and ask if this one will be just like the last one. In terms of the project approach, what is the *BEST* response you can offer?
- As the project manager, you will protect the team from executive interference
  - You will take a life-cycle approach to managing the project
  - You will ask the project team for a list of difficult stakeholders so that you can defuse problems before they begin.
  - Your project management approach is calm, cool, and collected
9. The Director of Product Development and the chief engineer of the company have decided to add scope to the project you are managing. They have completed the necessary paperwork, received the required sign-offs and have told you to simply get it done. In this instance you are probably:
- In a strong matrix environment
  - Project administrator
  - Working a balanced matrix function
  - Project expediter
10. The project team has been arguing about what should go into the project management plan. They've built the same product over a hundred times before and have always been bothered that the project management plan never seemed to get completed. They were determined to get it done *right* this time. The team has come to you for advice regarding the project management plan. The most *appropriate* response you can give them is:
- Use project phase concepts ; initiate, plan, execute, monitor & control, and close
  - They need training in project management
  - The 'project' is really operations
  - Tell them to take direction from the PMO
11. Management by Objectives is most successful when:
- The organization's executives stay out of the way of the project team
  - Management delegates the work of the organization to the most senior project managers
  - You were managing projects in the 1950s. Technique is rarely used now
  - It is supported by upper management
12. The portfolio manager from your division thought it might be helpful to the project teams if she delivered a short presentation on the elements in her portfolio. A number of team members, after receiving the e-mail announcement for the presentation, come to you and ask if this meeting is worth their time. After all isn't a portfolio just a big project? As a Senior Project manager your *best* response would be:
- You're right. The meeting probably would be a waste of your time
  - Not really. A portfolio is a group of related projects managed together to achieve synergies between the projects and establish common methods and procedures.
  - Not really. A portfolio can be a group of programs, projects, or sub-projects designed to help the organization meet specific business goals

- d. Not really. A portfolio is a collection of documents, methods, and procedures that help us manage projects
13. The executives are debating about whether to implement a PMO for their organization. One of the executives thinks that PMO means 'project management overhead' while others are wondering about the actual value it will bring to the organization. As a senior project manager, they bring you in to the meeting on a consultative basis to help them get their hands around what value the PMO brings the organization. All of the following answers are correct *except*:
- a. The PMO serves as a disciplinary organization for project managers
  - b. The PMO helps the organization align its projects around strategic organizational objectives
  - c. The PMO provides the organization with project management standards, methods, and procedures
  - d. The PMO helps to mentor and train project managers within the organization
14. All of the statements about the project life cycle are true *except* which of the following:
- a. The project life cycle consists of five distinct phases
  - b. The project life cycle is different for every organization
  - c. The project life cycle works with the project management life cycle to help meet project objectives
  - d. The project life cycle can be modified depending on the needs of the project
15. You have contracted a third-party to install five rack-mounts and the server gear at your new data center for your new web service, which is designed to handle 50,000 simultaneous users. The performing organization stated you could have a custom-designed system and sit down with an architect to do that, however, they have a catalog of 10 systems that they can build from the simplest to the most complex. If you want to pick something from the catalog, the configuration is well known and well understood, and their installation time can literally be cut in half, saving you considerable funds. You selected one of the 10 catalog systems because there was one that coincided with your needs to a 99% level. You also assigned a senior project manager from your organization to coordinate all activities with the vendor for installation. A week later you hear the project manager having a heated discussion with one of the junior project managers about whether this installation constitutes a project or operations. The junior project manager maintains that the installation is time bound and delivers a unique product process or result and by definition, is a project. The Senior Project manager counters with the following argument: it is fundamentally operations because the performing organization does this all the time. The configuration selected came out of a catalog which means that the installation is a repetitive, predictable, and repeatable process which is why they could do it on such a narrow fixed-price basis. What is the *best* response you could give to the junior and senior project manager?
- a. The Junior Project manager is correct: this is a project
  - b. The Senior Project manager is correct: this is operations
  - c. This is a project that has elements of operations
  - d. It really depends upon from whose point of view the question is being asked
16. All of the following reasons elaborate why is it important for the project manager to consider stakeholder influence on a project, *except* for which of the following?
- a. The negatively impacted stakeholder can create significant road blocks for your project
  - b. All the stakeholders control your budget
  - c. Stakeholders may supply technical expertise or resources to your project
  - d. Stakeholders provide many of the key requirements that need to be fulfilled for the successful completion of the project
17. The organization wants you to manage a project with a very aggressive timeline. You have done an initial assessment of the statement of work, the timeline, resource availability, and the budget. Based on this

information you have reported back to senior management at their aggressive timeline is a fiction and it will be impossible to meet given the scope of work. Senior management then asks you what the most effective project phase approach would be employed to compress the timeline given that the project is fraught with many uncertainties, risks and is something that the organization has never tried before. The *most likely* response you would give to address this situation is:

- a. You recommend the overlapping phase approach. This would allow work on a subsequent phase to start before the predecessor phase had completed
  - b. You recommend an iterative approach. It helps reduce complexity and is useful when partial delivery of a product is beneficial to the stakeholders
  - c. You recommend the inverse-evolutionary phase approach. Since his project sounds more like an R&D project you have no idea what the real scope is or when you will be done. Innovation cannot be timed on a punch clock
  - d. You recommend the adaptive phase approach. It addresses high-change, high-risk, high uncertainty projects effectively
18. Several junior programmers ask you about the difference between the product life cycle and the project life cycle. The *best* answer that you can give them in describing the difference between the two is:
- a. The product life cycle and the project life cycle coincide - the difference is that the product life cycle has to do with the product created whereas the project life cycle has to do with the work needed to create the product
  - b. The product life cycle addresses the entire life time of the product, whereas the project life cycle is to work needed to create the product
  - c. The product life cycle addresses the time that is needed to initially create the first iteration of the product, whereas the project life cycle endures for the lifetime of the product
  - d. The real answer addresses the sequence of the two: product life cycle completes before project life cycle begins
19. You have just collected project information from stakeholders and are analyzing their input with the project team. One stakeholder is worried about whether the organization has the proper skill sets in-house to deliver the product of the project. This can be best described in project management terms as:
- a. A constraint
  - b. A potential risk
  - c. An issue
  - d. A and C
20. You are the program manager for a large multimillion dollar program managing 10 projects, each with a project manager. Because of the varying complexity of the projects, there are at least three different project life cycle types are being used across the 10 projects. Some of the project managers are discussing whether the project management life cycle needs to change to adjust to different project life cycles. The *most correct* answer that you can give them is:
- a. The project management life cycle is applied to every project phase
  - b. The project management life cycle may change depending on the specific project life cycle being employed
  - c. There is no difference between the project management life cycle and the project life cycle
  - d. The project management life cycle changes for each project
21. All of the following are project lifecycle approaches with the exception of \_\_\_\_\_.
- a. Iterative
  - b. Linear
  - c. Predictive
  - d. Adaptive

22. The project manager must be knowledgeable about organizational governance policies that relate to the product or service as well as sustainability requirements as they relate to project \_\_\_\_\_.  
a. Risk  
b. Constraints  
c. Planning  
d. Deliverables
23. Projects can intersect with operations at various points in the \_\_\_\_\_ lifecycle.  
a. Project  
b. Product  
c. Project management  
d. Process development
24. You are working in an organization in which the PMO offers consulting services to projects. This type of PMO is best described as:  
a. Supportive  
b. Directing  
c. Controlling  
d. Consultative
25. Project governance is an oversight function that aligns with organizational governance practices. As such, the governance framework provides the project manager and the team with structure, processes, decision-making models and tools for managing the project. What is the PMO's role in project governance?  
a. The PMO has no role in project governance  
b. The PMO may have some role in project governance  
c. The PMO may play a decisive role in project governance  
d. The PMO plays a distinct leadership role in project governance
26. If the goals of a project conflict with the organization's business strategy, whose responsibility is it to identify these conflicts?  
a. Project manager  
b. Sponsor  
c. Program manager  
d. Portfolio manager

## Chapter 2 Test Answers

1. C –Initiating, Planning, Executing, Monitoring and Controlling, Closing. *PMBOK® Guide*, 5th edition, p 51.
2. D – Project coordinators have minimal decision authority on projects. Thus by PMI®'s definition of a PM, (you are authorized to commit resources and spend money) you are not an actual project manager. A resource coordinator is an HR function and 'functional expeditor' is a made-up term
3. D – High to almost total control on a project identifies a projectized organization
4. A – Scrum is in agile method that utilizes the iterative approach to development
5. C – The first part of the question is a red herring. The VP is asking about the lifetime of the deliverable i.e. the product. This is a question about the product status.
6. B – The key job of the project manager is to meet the organization's project objectives
7. D – this is the definition of a dedicated project team. Projectized and composite describe organizational structures. Focused is a made-up term. *PMBOK® Guide*, 5th edition, p. 37
8. B – Taking a life cycle approach to the project is the best answer you can give. Answers A and C might be tactics you employ while managing the project. Answer D is meaningless
9. D – The director and the chief and an engineer have all the responsibility, therefore you are just a project expeditor
10. C - Since the project team has done the same thing a hundred times before, this is an assembly line process, which makes it operations
11. D – This is the only possible answer, *PMP® Exam Prep* p 2-22
12. C – A portfolio can be a group of projects, programs, subprojects, or any combination of the previous. *PMBOK® Guide*, 5th edition, p 9
13. A – The PMO does not discipline project managers. Insubordination and other similar issues are the province of human resources, functional managers and senior management
14. A – The project life cycle changes for every organization. The *project management* life cycle consists of five distinct process groups. *PMBOK® Guide*, 5th edition, pp 48-49
15. D - That was like reading *War and Peace* wasn't it? Sometimes you get long-winded questions on the exam. Point of view is the most important element in this question; to the customer it is a project, however to the performing organization it is operations (it's an assembly line process)
16. B – If *all* the stakeholders control your budget, you're in trouble. Funding primarily comes from the sponsor/ senior management, who can be a potential stakeholder. *PMBOK® Guide*, 5th edition, p. 54
17. D - The project as described - a high-risk, high uncertainty project - is best addressed with an adaptive phase approach. *PMBOK® Guide*, 5th edition, p.46
18. B – Product lifecycle addresses the lifetime of the product; project life cycle is to work needed to create the product. *PMBOK® Guide*, 5th edition, pp 18-21
19. D – This is not exactly a trick question, but it's close. The scenario described is not only a constraint (no internal headcount with the skillset), but it is also an issue (if I need additional headcount, how do I go about obtaining it?)
20. A - The project management life cycle is *applied to every phase of your project life cycle* regardless what that project life cycle looks like. *PMBOK® Guide*, 5th edition, pp 18-21
21. B - Linear is not a project lifecycle defined by PMI®. *PMBOK® Guide*, 5th edition, pp 44-46
22. D - Deliverables is the correct answer. *PMBOK® Guide*, 5th edition, p.15
23. B - Product lifecycle. *PMBOK® Guide*, 5th edition, p.12
24. A - the scenario describes a supportive PMO. *PMBOK® Guide*, 5th edition, p.11
25. C - the PMO may play a decisive role in project governance. *PMBOK® Guide*, 5th edition, p. 34
26. A - the project manager identifies and documents these conflicts. *® Guide*, 5th edition, p. 15

# Chapter 3 Project Management Processes and Knowledge Areas

## Topics Covered:

- ▶ Project Management Processes
- ▶ Project Management Process Groups
- ▶ Process Interactions
- ▶ Project Management Process Mapping

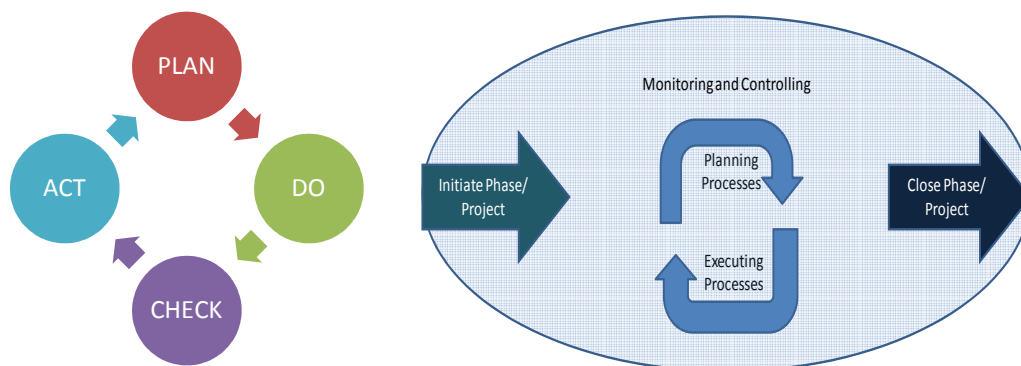
## Section Objectives

- ▶ Identify the five stages of the PM life cycle
- ▶ List and define the 10 PMI® knowledge areas
- ▶ Explain the processes and characteristics within each process group
- ▶ Elaborate the *PMBOK® Guide*, 5th edition 1) inputs, 2) tools and techniques, and 3) outputs are. What you need to know about them to pass the exam
- ▶ Map the 47 major processes by knowledge area

## The Project Management Process Groups



The five process groups are based on a variant of the Shewhart-Deming Plan-Do-Check-Act Cycle:



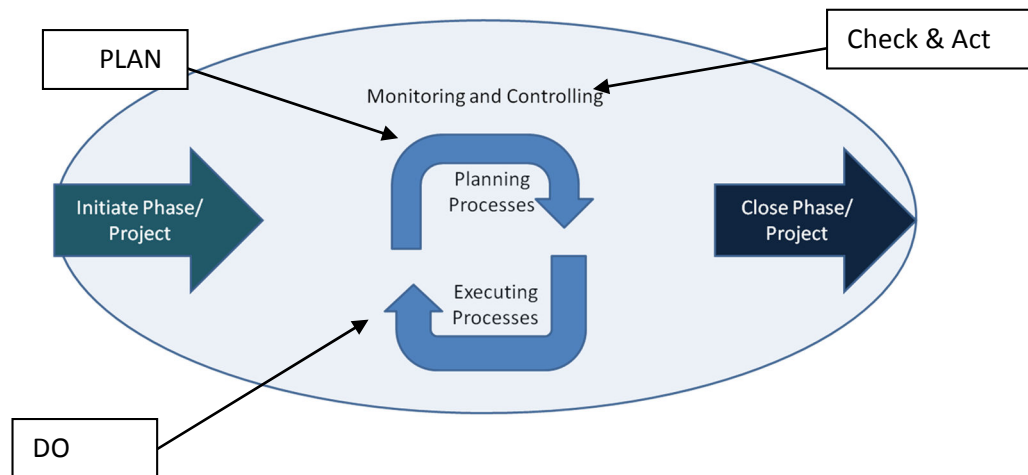
Notice that the Planning and Executing Processes are iterative<sup>12</sup>

The Shewhart-Deming plan-do-check-act cycle is the fundamental basis of incremental improvement for all manufactured product or business processes. The IPECC process is basically a variant on the Shewhart-Deming cycle:

- The initiating process is basically the entry point into the cycle
- The closing process is basically the exit point from the cycle

<sup>12</sup>Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p 50

- The plan-do-check-act iteration maps in the following manner to the IPECC cycle:



Based on the *PMBOK® Guide*, 5th edition<sup>13</sup>

A key point to understand in the IPECC cycle is that Planning and Executing processes are *iterative*. Notice also that monitoring and controlling processes are an 'umbrella' type of process, in that all the other processes within the IPECC cycle are in some way monitored and controlled. We are constantly checking the results of our work and making actionable decisions based on what we discover.

## Initiating Process Group

The key purpose of the initiating process group is to align the stakeholder's expectations with the project's purpose. The primary elements in initiating a project include:

### Stakeholder process

- Identify stakeholders / stakeholder identification techniques\*

### Integration processes

- Determine phase/project goals
- Obtain authorization to start phase/project
- Determine initial scope
- Identify constraints and assumptions
- Select/assign project manager
- Project statement of work
- Define high-level resource requirements
- Determine initial financial resources

<sup>13</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p. 50



- Verify success criteria
- Create project charter/ charter elements\*
- Obtain formal approval of charter

Several other supporting actions that help to complete the initiating process include the following:

- Subdivide large projects into phases
- Document the business case and the cost-benefit analysis\*
- Project selection criteria (e.g. cost, feasibility, impact)\*
- Ensure the project scope is achievable
- Identify high-level risks and requirements/ risk identification techniques\*
- Facilitate resolution of conflicting stakeholder objectives
- Create an order of magnitude budget and schedule estimate
- Determine critical success factors for the project

\* These elements address specific knowledge and skills needed by the PM in the Initiating process

#### Initiating Tasks

- ▶ Task 1: perform project assessment based upon available information, lessons learned from previous projects, and meetings with relevant stakeholders in order to support the evaluation of the feasibility of new products or services within the given assumptions and/or constraints.
- ▶ Task 2: identify key deliverables based on business requirements in order to manage customer expectations and direct the achievement of project goals.
- ▶ Task 3: perform stakeholder analysis using appropriate tools and techniques in order to align expectations and gain support for the project.
- ▶ Task 4: identify high-level risks, assumptions, and constraints based on the current environment, organizational factors, historical data, and expert judgment, in order to propose an implementation strategy.
- ▶ Task 5: participate in the development of the project charter by compiling and analyzing gathered information in order to ensure pressure stakeholders are in agreement on its elements.
- ▶ Task 6: obtain project charter approval from the sponsor, in order to formalize the authority assigned to the project manager and gain commitment and acceptance for the project.
- ▶ Task 7: conduct benefit analysis with relevant stakeholders to validate project alignment with organizational strategy and expected business value.
- ▶ Task 8: inform stakeholders of the approved charter to ensure common understanding of the key deliverables, milestones, and their roles and responsibilities.

**Exam tip:** The primary goals of the Initiating processes are:

1. develop the project charter and
2. identify stakeholders

**Exam tip:** In the Initiating processes, understand the following:

- Staffing levels are low
- Costs are low
- Chance of success is low
- Risk is high
- Stakeholder influence is high

## Planning Process Group

While the main goal of the Planning process group is to create the Project Management Plan, other subsidiary management plans are also created here. This includes subsidiary management plans for scope, schedule, budget, quality, human resources, communications, risk, and procurement knowledge areas defined in the *PMBOK® Guide*, 5th edition. Below is a listing of the major elements you can expect to find as part of the Planning process:

- Create scope statement
- Create scope management plan
- Create WBS (work breakdown structure)
- Create network diagram
- Estimate activity durations
- Estimate costs
- Determine project schedule
- Refine time and cost estimates
- Create communications plan
- Develop Human Resource Plan
- Create Staffing Management Plan
- Develop Communications Management Plan
- Determine project budget
- Develop quality management plan
- Identify risks
- Qualitatively and quantitatively rank risks
- Develop risk response plan
- Adjust estimates as necessary
- Develop procurement management plan
- SOW (procurement statement of work)
- Create procurement documents
- Develop PM plan
- Obtain approval of plan
- Hold kick-off meeting<sup>14</sup>

Additional knowledge and skills needed by the PM for planning activities also include:

---

<sup>14</sup>Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013pp 47-55

- Describing each work package in the WBS dictionary
- Evaluating other projects for potential positive or negative impacts on this project
- Identifying quality metrics for the project
- Requirements gathering techniques
- WBS tools and techniques
- Time budget and cost estimation techniques
- Scope management techniques
- Resource planning process
- Workflow diagramming techniques
- Type and uses of org charts
- Elements, purpose and techniques of:
  - Project planning
  - Communications planning
  - Quality management planning
  - Risk management planning
  - Procurement planning
  - Change management planning

***With the planning process group, it is critical to understand that neither the project management plan nor any of the subsidiary management plans are finalized until a thorough risk assessment and identification has been performed.***

***The primary goal of the Planning process is to develop the project management plan.***

## Planning Tasks

- ▶ Task 1: review and assess detailed project requirements, constraints, and assumptions with stakeholders based on the project charter, lessons learned, and by using requirement gathering techniques to establish detailed project deliverables.
- ▶ Task 2: develop a scope management plan, based in the approved project scope and using scope management techniques, in order to define, maintain, and manage the scope of the project.
- ▶ Task 3: develop the cost management plan based on the project scope, schedule, resources, approve project charter and other information, using estimating techniques, in order to manage project costs.
- ▶ Task 4: develop the project schedule bits of the approved project deliverables and milestones, scope, and resource management plans in order to manage timely completion of the project.
- ▶ Task 5: develop the human resource management plan by defining the roles and responsibilities of project team members in order to create a project organizational structure and provide guidance regarding how resources will be assigned and managed.

- ▶ Task 6: develop the communications management plan based on the project organizational structure and stakeholder requirements, in order to define and manage the flow of project information.
- ▶ Task 7: develop the procurement management plan based on the project scope, budget, and schedule, in order to ensure that the required project resources will be available.
- ▶ Task 8: develop the quality management plan define the quality standards for the project and its products based on the project scope, risks, and requirements, in order to prevent the occurrence of defects is control the cost of quality.
- ▶ Task 9: develop the change management plan by defining how changes will be addressed and controlled in order to track and manage change.
- ▶ Task 10: plan for risk management by developing a risk management plan; identifying, analyzing, and prioritizing project risk; creating the risk register; and defining risk response strategies in order to manage uncertainty and opportunity throughout the project lifecycle.
- ▶ Task 11: present the project management plan to the relevant stakeholders according to applicable policies and procedures in order to obtain approval to proceed with project execution.
- ▶ Task 12: conduct kickoff meeting, communicating the sort of the project, key milestones, and other relevant information in order to inform and engage stakeholders and gain commitment.
- ▶ Task 13: develop the stakeholder management plan by analyzing needs, interests, and potential impact to effectively manage stakeholder's expectations and engage them in project decisions.

## Executing Process Group

The processes in this group are performed to complete the work in the project management plan that was designed to satisfy the project specifications. As the project manager, you are responsible for coordinating the activities of human resources as well as infrastructure resources and integrating the activities of both in accordance with the project management plan.

As a result, several or all of the plans created in the planning process may require replanning, updates and re-baselining during project execution. A large portion of the project budget is normally expended during the Executing Process Group processes.

The primary elements in the Executing process group include:

- Complete work packages
- Use a work authorization system
- Collect status information
- Hold meetings
- Acquire, develop and manage project team

- Distribute project information
- Obtain bids from outside vendors
- Select a vendor
- Negotiate vendor contract
- Manage contracts
- Perform quality assurance
- Manage Stakeholder Expectations

Additional knowledge and skills needed by the PM for executing activities also include:

- Project monitoring tools and techniques
- Elements of a statement of work
- WBS interaction elements within the project schedule
- Project budgeting tools and techniques
- Quality standard tools
- Continuous improvement process

***The primary goal of the Executing process is to direct and manage project work.***

#### Executing Tasks

- ▶ Task 1: acquire and manage project resources by following the human resource and procurement management plans in order to meet project requirements.
- ▶ Task 2: manage task execution based on the project management plan by leading and developing the project team in order to achieve project deliverables.
- ▶ Task 3: implement a quality management plan using appropriate tools and techniques in order to ensure work is performed in accordance with required quality standards.
- ▶ Task 4: implement approved changes in corrective actions by following the change management plan in order to meet project requirements.
- ▶ Task 5: implement approved actions by following the risk management plan in order to minimize the impact of project risks and take advantage of opportunities on the project.
- ▶ Task 6: manage the flow of information by following the communications plan in order to keep the stakeholders engaged and informed.
- ▶ Task 7: manage stakeholder relationships by following the stakeholder management plan in order to receive continued support and manage expectations.

### Monitoring and Controlling Process Group

The focus in the monitoring and controlling process group is to measure the performance of the project and address change requests, recommended corrective and preventive actions, and implement defect repairs.

The elements in the Monitoring and Controlling process group include:

- Performance measuring
- Performance reporting
- Identify and control changes
- Verify and control scope
- Control schedule
- Control cost
- Control quality
- Risk monitoring and control
- Take corrective action
- Update PM plan
- Update actions and changes
- Inspections
- Accept/Reject work
- Identify & analyze trends
- Look for new risks
- Assess variances for change or corrective action
- Manage Stakeholders
- Contract administration
- Use quality control tools
- Project performance appraisals
- Perform earned value calculations

Additional knowledge and skills needed by the PM for monitoring and controlling activities also include:

- Performance measurement and tracking techniques (e.g. PERT, EV, CPM)
- Project control limits and thresholds
- Project performance metrics
- Cost analysis techniques
- Project plan management techniques
- Change management techniques
- Integrated change control processes
- Risk identification and analysis techniques
- Risk response techniques
- Problem solving techniques (e.g. root cause analysis)
- Reporting procedures

***The primary goals of this process group are: Monitor and Control Project Work and Integrated Change Control***

Typically, this is one of the lowest scoring process groups on the PMI® exam. Make sure you spend adequate time studying and understand the concepts and actions taken in this area. You may see exam

questions regarding the following actions required to complete the monitoring and controlling process group:

- Perform root cause analysis
- Secure additional funding, if needed
- Perform validated defect repair
- Calculate the ETC (estimate to complete)
- Reassess project control systems for effectiveness

**Exam Tip.** For the exam assume that:

- The project management plan and subsidiary plans are complete and realistic
- You measure the project against defined metrics to determine how well the project is performing
- You implement corrective actions for any variances
- If there are deviations from the project management plan, that is the responsibility of the project manager, and the Project manager is responsible for correcting those deviations without issuing a change request. CRs should be used only as a last resort in this instance.

#### Monitoring and Controlling Tasks

- ▶ Task 1: measure project performance using appropriate tools and techniques in order to identify and quantify any variances and corrective actions.
- ▶ Task 2: manage changes to the project by following the change management plan in order to ensure that project goals remain the line with business needs.
- ▶ Task 3: verify that product deliverables conform to the quality standards established in the quality management plan by using appropriate tools and techniques to meet project requirements and business needs.
- ▶ Task 4: monitor and assess risk by determining whether exposure has changed and evaluating the effectiveness of response strategies in order to manage the impact of risks and opportunities on the project.
- ▶ Task 5: review the issue log, update if necessary, and determine corrective actions by using appropriate tools and techniques in order to minimize the impact on the project.
- ▶ Task 6: capture, analyze, and manage lessons learned, using lessons learned management techniques and to enable continuous improvement.
- ▶ Task 7: monitor procurement activities according to the procurement plan in order to verify compliance with project objectives.

## Closing Process Group

The primary elements in the Closing process group include:

- Perform final product verification
- Deliver final contract performance reporting

- Audits of all procured service/merchandise
- Obtain formal contract acceptance
- Create a contract archive
- Complete final performance reporting
- Obtain formal acceptance of project
- Document and lessons learned
- Create the project archives
- Release all project resources

Additional knowledge and skills needed by the PM for closing activities also include:

- Contract closure requirements
- Basic project accounting principles
- Close-out procedures
- Feedback techniques
- Project review techniques
- Archiving techniques and statutes
- Compliance
- Transition planning techniques

### Closing Tasks

- ▶ Task 1: obtain final acceptance of the project deliverables from relevant stakeholders in order to confirm the project scope and deliverables were achieved.
- ▶ Task 2: transfer the ownership of deliverables to the assigned stakeholders in accordance with the project plan in order to facilitate project closure.
- ▶ Task 3: obtain financial, legal, and administrative closure using generally accepted practices and policies in order to communicate for a project closure and ensure transfer of liability.
- ▶ Task 4: prepare and share the final project report according to the communications management plan in order to document and convey project performance and assist in project evaluation.
- ▶ Task 5: collate lessons learned that were documented throughout the project and conduct a comprehensive project review in order to update the organization's knowledge base.
- ▶ Task 6: archive project documents and materials using generally accepted practices in order to comply with statutory requirements and for potential use in future projects and audits.
- ▶ Task 7: obtain feedback from relevant stakeholders using appropriate tools and techniques and based on the stakeholder management plan in order to evaluate their satisfaction.

The project is only complete when administrative closure of the project has been completed. Whether the project has completed all scope elements, has completed a specific project phase, or is canceled, the project is not officially closed until Administrative Closure has been completed.



If the scope of the project has been completed, the listing above is generally a good guide to the administrative closure process. However, if the project was terminated or stopped after a specific phase, you want to document the reasons for the early termination in your closeout documentation.

If your project was successful, and of course it will be because you are an excellent project manager, there is one final step you must never forget: CELEBRATE!

## Project Information

During project execution, data from the project is continuously collected and analyzed for the purpose of reporting back to senior management and stakeholders on the status and progress of the project. PMI® makes distinctions between three types of project information that may appear on the exam:

- **Work Performance Data:** this consists of the raw observations and measurements taking during the performance of project activities to carry out the project work. Examples can include percentage of work completed, quality and technical performance measurements, start and finish dates of scheduled activities, number and frequency of change requests, defect counts, costs and generations, etc.
- **Work Performance Information:** this is performance data collected from various monitoring and controlling processes which is analyzed and integrated across all project areas. Examples include status of deliverables, status of change requests, forecasted estimates to completion, etc.
- **Work Performance Reports:** work performance information that has been collected in project documents. This can be in the form of dashboard reports, spotlight reports, Jeopardy reports, status and progress reports, memos, recommendations, updates, etc.

## Cross-Cutting Skills

PMI® has defined what is described as cross-cutting skills needed by the PM that apply to all process groups. These skills include:

- Active listening
- Brainstorming techniques
- Conflict resolution techniques
- Cultural sensitivity and diversity
- Data gathering techniques
- Decision making techniques
- Facilitation
- Information management tools, techniques, methods
- Leadership tools, techniques
- Negotiating
- Oral and written communication techniques, channels, applications
- *PMI's Code of Ethics and Professional Conduct*
- Presentation tools and techniques
- Prioritization/time management

- Problem-solving tools, techniques
- Project management software
- Relationship management
- Stakeholder impact analysis
- Targeting communications to intended audiences
- Team motivation methods

CRITICAL NOTE:

***Review the high level elements in the Initiating, Planning, Executing, Monitoring and Controlling and Closing process groups from pages 3-4 thru 3-13 regularly. As you review each knowledge area, specifically review the process groups that apply to the knowledge area. This is critical for maintaining a high level perspective for the PMP examination.***

## Knowledge Area Logistics

There are ten key knowledge areas contained in the *PMBOK® Guide*, 5th edition. Each key knowledge area along with its subsidiary processes all follow the same format when describing deliverables for each process:

- **Inputs**- these are the documents and processes that contain the data and information from the project which are then acted upon by:
- **Tools and Techniques** - which can include formal analysis, the use of mathematical models and templates to produce:
- **Outputs** - which are the desired results of the process

In this manual these elements will be represented in the graphic below:

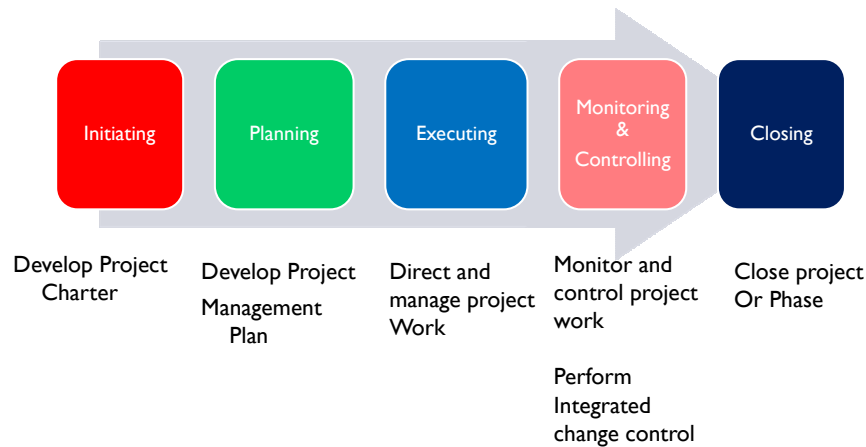


The ten PMI® Knowledge Areas:

Project Integration Management	Project Human Resources Management
Project Scope Management	Project Communications Management
Project Time Management	Project Risk Management
Project Cost Management	Project Procurement Management
Project Quality Management	Project Stakeholder Management

On the next pages we will show the general processes that apply to each of the ten PMI® knowledge areas.

## Project Integration Management

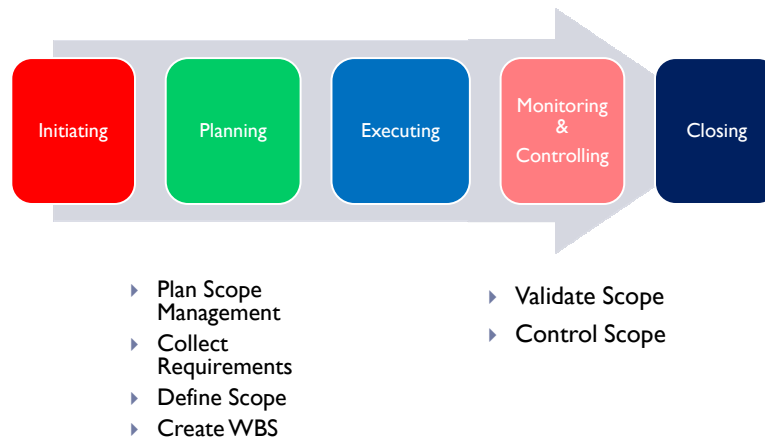


For the purposes of the exam, the primary job of the project manager is to assemble all the parts and pieces of the project into a coherent whole. The way the project manager does this is through Project Integration activities.

The Project Integration is the only area that has activities in all five of the PMI® process groups. The following six processes and the primary goals of these processes are listed below:

- Develop project charter. Goal: the project charter
- Develop project management plan. Goal: the project management plan
- Direct and Manage Project Work. Goal: deliverables
- Monitor and control project work. Goal: change requests, work performance reports
- Perform integrated change control. Goal: approved change requests, change log
- Close project or phase. Goal: Final product, service, or result transition

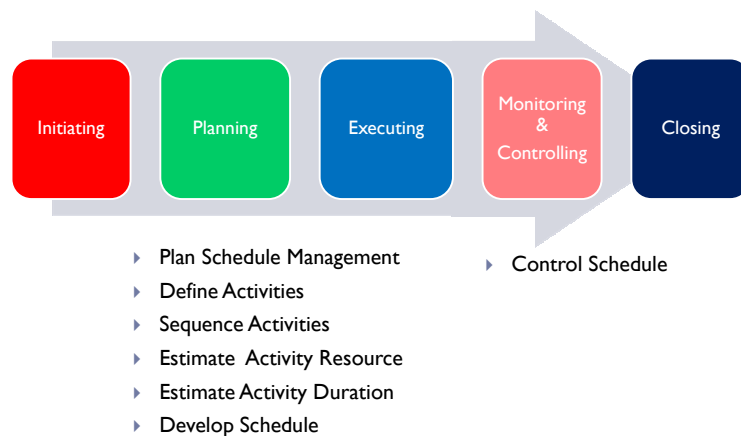
## Project Scope Management



Project scope management focuses on the processes that are needed to ensure that the work of the project, and only the work required, is performed to deliver project success. The following processes and the primary goals of project scope management are defined below:

- Plan Scope Management. Goal: Scope Management Plan
- Collect requirements. Goal: requirements documentation
- Define scope. Goal: Project scope statement
- Create WBS. Goal: Scope Baseline
- Validate Scope. Goal: accepted deliverables
- Control scope. Goal: updates and change requests

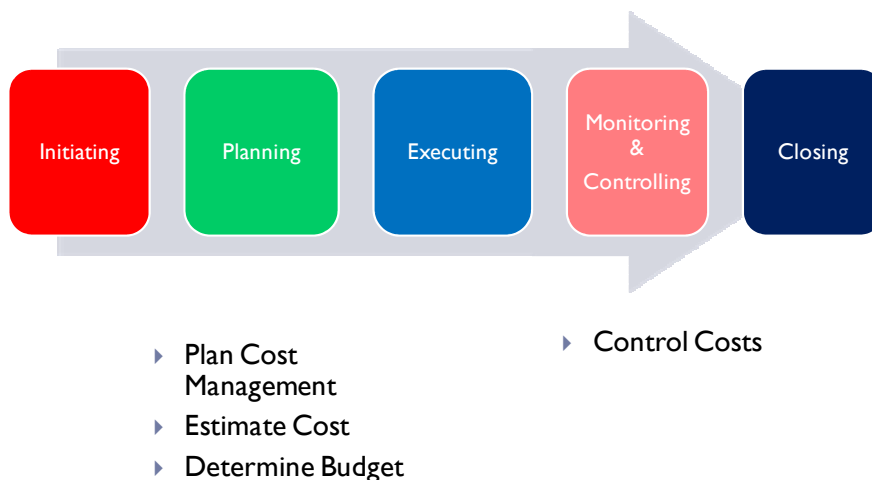
## Project Time Management



Project Time management includes all the activities necessary to complete the project in a timely fashion. The following processes and the primary goals of project time management are defined below:

- Plan Schedule Management. Goal: Schedule Management Plan
- Define activities. Goal: activity list
- Sequence activities. Goal: project schedule network diagrams
- Estimate activity resources. Goal: activity resource requirements
- Estimate activity durations. Goal: activity duration estimates
- Develop schedule. Goal: schedule baseline
- Control schedule. Goal: schedule forecasts

## Project Cost Management

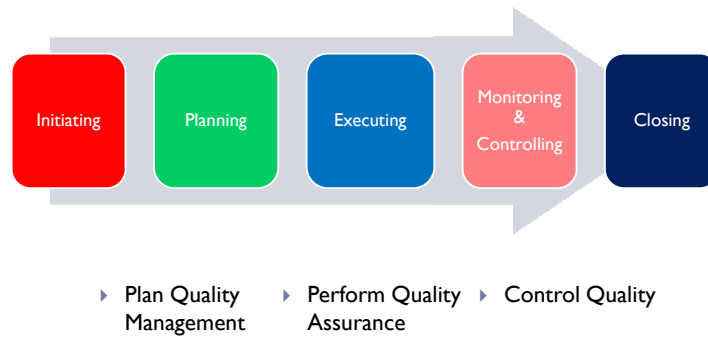


Project cost management involves the processes that are needed to estimate, budget, and control costs, so the project can be completed within the approved budget.

The following processes and the primary goals of project cost management are defined below:

- Plan Cost Management. Goal: Cost Management Plan
- Estimate costs. Goal: activity cost estimates
- Determine budget. Goal: cost performance baseline
- Control costs. Goal: cost forecasts, change requests

## Project Quality Management

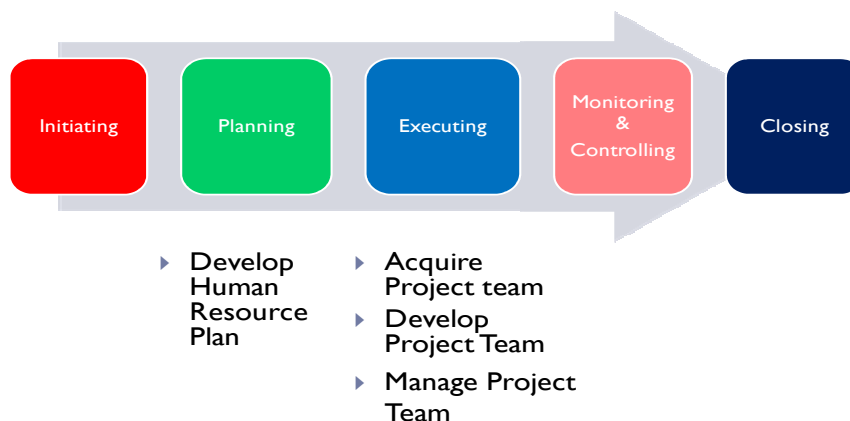


Project quality management focuses on the activities, quality policies, objectives, and measurements required to satisfy the needs of the project and ultimately the customer.

The following processes and the primary goals of Project quality management are defined below:

- Plan quality. Goal: quality management plan
- Perform quality assurance. Goal: change requests
- Control quality. Goal: verified deliverables, validated changes

## Project Human Resource Management

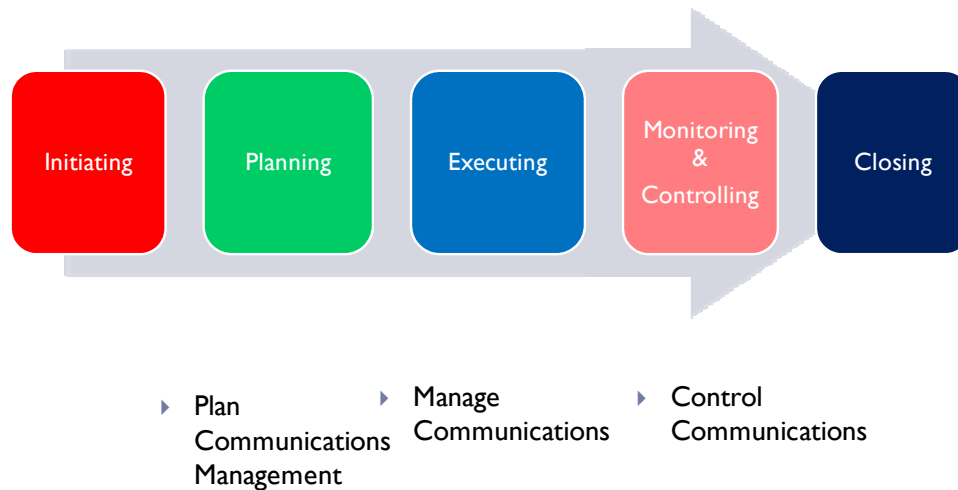


Project human resource management includes the processes that organize, manage, and lead the project team. The following processes and the primary goals of Project human resource management are defined below:

- Develop human resource plan. Goal: human resource plan
- Acquire project team. Goal: project staff assignments
- Develop project team. Goal: team performance assessments

- Manage project team. Goal: updates

## Project Communications Management

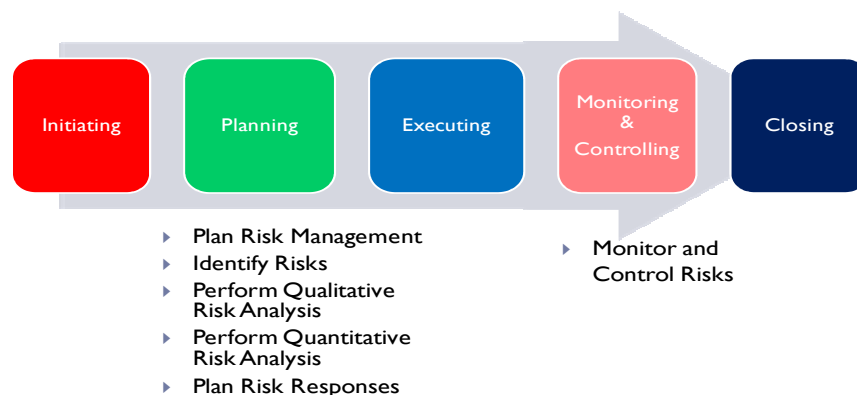


Project communications management focuses on the processes to deliver, collect, distribute, store, and retrieve project information to all internal and external project organization environments.

The following processes and the primary goals of Project communications management are defined below:

- Plan communications. Goal: communications management plan
- Manage Communications. Goal: project communications
- Control communications. Goal: work performance information, change requests

## Project Risk Management

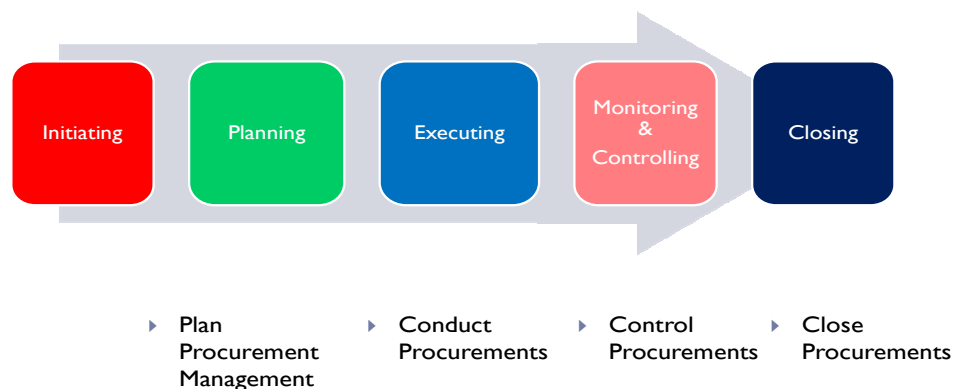


Project risk management focuses on the planning, identification, analysis, response planning, and monitoring and control of risk on a project.

The following processes and the primary goals of Project risk management are defined below:

- Plan risk management. Goal: risk management plan
- Identify risks. Goal: risk register
- Perform qualitative risk analysis. Goal: project documents updates
- Perform quantitative risk analysis. Goal: project documents updates
- Plan risk responses. Goal: project documents updates
- Monitor & control risks. Goal: project documents updates, change requests

## Project Procurement Management



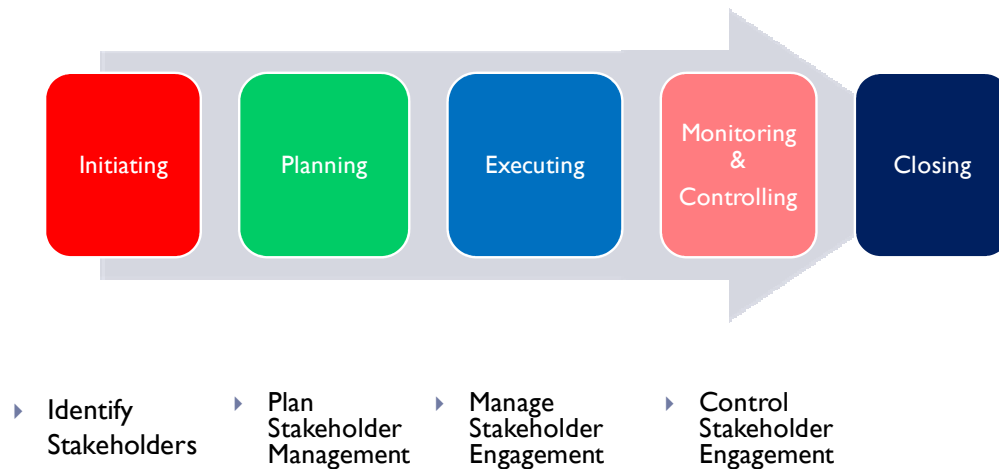
Project procurement management focuses on the processes needed to purchase or acquire products, services, or results from outside the project team or the organization.

The following processes and the primary goals of Project procurement management are defined below:

- Plan procurements. Goal: procurement management plan, procurement SOW
- Conduct procurements. Goal: select sellers, agreements (e.g. contract, sub-contract, PO, etc)
- Control procurements. Goal: procurement documentation, change requests
- Close procurements. Goal: closed procurements



## Project Stakeholder Management



Project stakeholder management identifies the processes required to identify the people, groups, organizations that can impact/be impacted by the project. It involves analyzing stakeholder expectations in developing management strategies for effectively engaging stakeholders and project decisions and execution. Stakeholder management also focuses on continuous communications with stakeholders, managing conflict and promoting appropriate stakeholder engagement in project decisions and activities.

The following processes and the primary goals of project stakeholder management are defined below:

- Identify Stakeholders. Goal: stakeholder register
- Plan Stakeholder Management. Goal: stakeholder management plan
- Manage Stakeholder Engagement. Goal: issue log, change requests
- Control Stakeholder Engagement. Goal: work performance information, change requests

## Role of the Knowledge Areas

A knowledge area can represent a set of concepts, terms, and activities that can constitute a professional field, a project management field, or some area of specialization. The ten knowledge areas described above are used on most projects most of the time. The interplay between the knowledge areas and the Project Management Process Groups are shown on the following page. For the PMP® exam, it is expected that the credentialed seeker will commit the 47 processes and their respective knowledge areas, as well as the interplay with the Project Management Process Groups to memory.

## Mapping Knowledge Areas to Process Groups

Process Groups >>> Knowledge Areas	Initiating	Planning	Executing	Monitoring & Controlling	Closing
<b>4. Project Integration Management</b>	Develop Project Charter	Develop Project Management Plan	Direct and Manage Project Work	Monitor and Control Project Work Perform Integrated Change Control	Close Project or Phase
<b>5. Project Scope Management</b>		Plan Scope Management Collect Requirements Define Scope Create WBS		Validate Scope Control Scope	
<b>6. Project Time Management</b>		Plan Schedule Management Define Activities Sequence Activities Estimate Activity Resources Estimate Activity Durations Develop Schedule		Control Schedule	
<b>7. Project Cost Management</b>		Plan Cost Management Estimate Costs Determine Budget		Control Costs	
<b>8. Project Quality Management</b>		Plan Quality Management	Perform Quality Assurance	Control Quality	
<b>9. Project HR Management</b>		Plan Human Resource Management	Acquire Project Team Develop Project Team Manage Project Team		
<b>10. Project Communications Management</b>		Plan Communications Management	Manage Communications	Control Communications	
<b>11. Project Risk Management</b>		Plan Risk Management Identify Risks Perform Qualitative Risk Analysis Perform Quantitative Risk Analysis Plan Risk Responses		Control Risks	
<b>12. Project Procurement Management</b>		Plan Procurement Management	Conduct Procurements	Control Procurements	Close Procurements
<b>13. Project Stakeholder Management</b>	Identify Stakeholders	Plan Stakeholder Management	Manage Stakeholder Engagement	Control Stakeholder Engagement	

Graphic above based on the *PMBOK® Guide*, 5th edition, p. 61

It is strongly recommended that the process groups, knowledge areas, their subsidiary processes and primary goals of the processes be well understood for the examination.

## Understanding Process Interactions

**IMPORTANT NOTE:** on the PMI®, PMP® exam, you will be assessed by process group, **not** by Knowledge Area. You will be graded as, 'proficient', 'moderately proficient' or 'not proficient' in each of the project management lifecycle process groups:

- Initiating
- Planning
- Executing
- Monitoring and Controlling
- Closing

While it is important to understand the processes in each knowledge area, it is more important to understand the interactions of the processes as they occur between the process groups. Many of the questions on the exam will test your understanding of what happens in each of the process groups. Notice on page 3 – 3 that the planning and executing processes iterate, and that this occurs under an umbrella of monitoring and controlling processes. In other words, all three process groups are occurring simultaneously, however, there are specific processes within those groups that occur in a cyclical fashion. Use the charts below to help you understand the process interactions. The specific interactions by knowledge area will appear at the beginning of each knowledge area chapter.

The table below outlines the specific, key output/deliverables by process group and knowledge area. You will find that if you address each knowledge area thoroughly, the contents of the table below will become committed to memory as you progress through this manual.

Initiating	Planning	Executing	Monitoring and Controlling	Closing
Integration: -Select Project manager -Create project charter	Project Management (PM) Plan	Deliverables Work Performance Data	-Change log -Approved CRs -CRs -Work Perf. Rpts.	Final product OPA updates
	-Scope Management Plan -Requirements Management Plan -Requirements Traceability matrix -Scope Statement -Scope baseline		-Accepted deliverables -CRs	
	Schedule Mgt. Plan Activity list/attributes Network diagrams Resource requirements Duration Estimates Schedule/baseline		-Work Performance Information -CRs	
	-Cost Management Plan -Cost estimates -Cost performance baseline		Budget forecasts	
	Quality: -Quality Management Plan -Metrics / checklists -Process Improvement Plan	CRs and updates	-Verified deliverables/changes -Work Performance Measurements -QC measurements	
	HR: Human Resource Plan	-Staff assignments -Team performance assessments -Resource calendars		
	Communications Management Plan	Project communications	Work performance information	
	Risk: -Risk Management Plan -Risk register/updates -Risk related Contract decisions -PM plan updates		Risk register Updates to: -Risk register -Project documents -CRs	
	<i>Procurement:</i> -Procurement Management Plan -Procurement SOW -Make-or-buy decisions	<i>Select Sellers Agreements</i>	<i>Procurements docs</i>	<i>Closed procurements</i>
Stakeholder Mgt: stakeholder register	<i>stakeholder management plan</i>	<i>issue log</i> <i>change requests</i>	<i>work performance information</i>	

## In Summary...

- ▶ This section mapped the ten PMI® knowledge areas:
- ▶ The five PM process groups and the importance in understanding the steps within each process group for the exam
- ▶ The definition of the 47 processes contained within each of the ten knowledge areas
- ▶ How those processes fit into the PM process groups

## Chapter Three Memory Check

1. The five process groups that comprise the project management life cycle are: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_
2. The two primary outputs of the Initiating process are the project \_\_\_\_\_ and identify \_\_\_\_\_
3. The primary goal of the planning process group is to produce the \_\_\_\_\_.
4. The ten Knowledge Areas of the *PMBOK® Guide*, 5th edition are, in short, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_
5. Over half of the processes that occur in the ten knowledge areas of the *PMBOK® Guide*, 5th edition occur in the \_\_\_\_\_ process group
6. Only the \_\_\_\_\_ knowledge area has processes in all five of the process groups of the project management life cycle
7. Two primary goals of the Monitoring and Control process group are to \_\_\_\_\_ project work and to perform \_\_\_\_\_
8. Early in the project the \_\_\_\_\_, and the \_\_\_\_\_ of \_\_\_\_\_ are low – the \_\_\_\_\_ and \_\_\_\_\_ are high
9. PMI® defines how a project will tighten its estimates for budget and timeline as more is learned about the project as a \_\_\_\_\_
10. There are \_\_\_\_\_ processes spread across the ten Knowledge Areas in the *PMBOK® Guide*, 5th edition
11. Percentage of work completed, quality and technical performance measurements, start and finish dates of scheduled activities is known as \_\_\_\_\_, whereas status of deliverables, status of change requests, forecasted estimates to completion is called \_\_\_\_\_

## Chapter 3 Test

1. You are managing a project in which the organization utilizes the 'waterfall approach' in executing projects. They have adopted the PMI® 'methodology' and the IPECC approach has become the foundation for their internal project methodology. Senior management has approached you and has insisted that you use the phased approach as defined by PMI® in delivering the project: initiate, plan, execute, monitor and control, and close (IPECC). What is the *most factual* information you can give senior management regarding IPECC process groups?
  - a. You will follow the PMI® methodology to the letter
  - b. You will follow the PMI® methodology if the specific project warrants its use
  - c. The process groups are not project phases
  - d. IPECC will only work if you use all the processes in the ten key process areas
2. What is the primary purpose of the Initiating process group?
  - a. Determine the project goals
  - b. Align stakeholder expectations with the project's purpose
  - c. Determine the initial budget
  - d. Identify processes and standards
3. Validate Scope is part of what process group?
  - a. Planning
  - b. Executing
  - c. Closing
  - d. Monitoring and Controlling
4. The completion of work packages, holding meetings, distributing Project information, negotiating contracts and performing quality assurance are all part of what process group?
  - a. Executing
  - b. Planning
  - c. Initiating
  - d. Closing
5. The Planning process group touches all ten of the key knowledge areas in that planning has to occur in each of these areas. Which of the following is *not* part of the planning process?
  - a. Creating the WBS
  - b. Develop the project management plan
  - c. Estimate activity durations
  - d. Identify stakeholders
6. You are a senior project manager at a company that has just hired several junior project managers. Part of your job is to mentor these junior project managers so that they can rapidly become effective in the organization. Each of these junior project managers is a PMP® so you are reasonably sure that they understand the PMI® framework. You decide to find out how deep their knowledge goes and ask them, "How many of the processes in the key knowledge areas do we use all the time?" Which junior PM gave the *best* answer?
  - a. Jr. PM#1: All the processes have to be used all the time; otherwise you're not following the PMI® methodology.
  - b. Jr. PM#2: All the Planning processes have to be used all the time; you have some flexibility with the other process groups
  - c. Jr. PM#3: The Project manager and their teams are responsible for determining which processes are appropriate for the specific project

- d. Jr. PM#4: **All** processes in the Planning group that address the triple constraints of cost, time, and budget, along with risk planning must be done on all projects. The remaining processes are at the discretion of the project manager
7. In the Monitoring and Controlling process group, one of the primary goals of that group is to monitor and control the project work. What is the second equally important, major goal of the monitoring and control process?
- a. Quality control
  - b. Change control
  - c. Scope control and verification
  - d. Corrective action
8. You are just initiating a project for your organization. Which of the following is a true statement regarding the Initiating process?
- a. Risk is low but stakeholder influence is high
  - b. Staffing level is high while chance of success is low
  - c. Risk is high but the chances of success are also high
  - d. Stakeholder influence is high while costs are low
9. Your project is in the planning phase and many of the stakeholders are excited about the product that will be delivered once the project is done. You have solicited input from the stakeholders, addressed technical issues with the technical team, estimated costs, determined the high-level project schedule, created a statement of work, created a work breakdown structure, identified and quantified risks, developed the project management plan and all subsidiary key knowledge area plans, and received stakeholder sign off of the plan. What is the *next* thing you will most likely do?
- a. Verify stakeholder input
  - b. Hold a kickoff meeting
  - c. Consult management for a go/no-go decision
  - d. Place the project management plan under configuration management
10. In the Executing process group the main goal is to Direct and Manage Project Work. All of the following are elements in the executing process group with *one exception*:
- a. Complete work packages and use a work authorization system
  - b. Obtain bids from vendors, select vendors and negotiate the vendor contract
  - c. Collect status information and hold meetings
  - d. Validate the deliverables as the project is being executed
11. When does the Closure process occur?
- a. Closure occurs only at the end of the project
  - b. Closure activities can occur at the end of the project or at the end of a project phase
  - c. Closure occurs before the closeout of any contracts on the project
  - d. Closure occurs after the stakeholders have conducted user acceptance testing
12. The project you are managing includes many stakeholders, geographically distributed across the country. As part of the planning process you have put together a communications plan that will address the communications needs of all the stakeholders on the project, from the performing organization up to and including the sponsor. Part of this communications plan includes the distribution of information as well as reporting the performance of the team. The PMI® process groups you are utilizing are:
- a. Information distribution and performance reporting occur in the Executing process group
  - b. Information distribution and performance reporting occur in the Monitoring and Controlling process group

- c. Information distribution occurs in the Executing process group while performance reporting occurs in the Monitoring and Controlling process group
  - d. Information distribution occurs in the Monitoring and Controlling process group while performance reporting occurs in the Executing process group
- 13. You are engaged in a large project that requires complex coordination between many departments in your organization. You have almost completed the planning phase and are looking for sign-off of the project management plan. You have addressed overall project integration activities, the budget, the timeline, the scope of the work, quality planning, resource acquisition, communications for a distributed team, and some procurement activities that require the use of external vendors. What has the project manager forgotten to do?
  - a. Create a work breakdown structure
  - b. Risk assessment
  - c. Creation of a requirements traceability matrix
  - d. Creation of a change management system
- 14. There are many reasons for creating a lessons learned document in a project. All of the following represent reasons why you would create a lessons learned document with the *exception* of:
  - a. Creates an archive to advise future project teams about types of projects and resources they should avoid when initiating similar projects
  - b. Serves as a historical record for what worked and what did not work in your project so that future project teams can make use of the information
  - c. Used as a phase-end review tool so the team can implement incremental process improvement activities for the subsequent phases
  - d. Gives all project stakeholders a chance to input what issue resolution approaches were most effective for them on the project
- 15. You have been brought into a project for a 'project rescue'. Management had issues with the previous project manager and dismissed him from the company. You sit down with the project team for the first time and discover that there is a lot of activity going on and that the project is well under way: the requirements have been completed and design work is about half way done. However, there is a lot of contention between the members of the performing organization. A number of people are arguing about who should handle what activities, how long they are going to take, and in what order the activities should occur. From listening to these arguments it becomes clear to you that the prior project manager *probably* did not do what?
  - a. Obtain formal approval of the project charter
  - b. Identify processes and standards
  - c. Determine the project schedule
  - d. Create a project management plan
- 16. The team has completed all design work and is ready to start creating a product of the project. There are construction and IT elements in this project, and the project manager has leaned heavily on the subject matter experts in the organization for their technical expertise and know-how. You have determined that some of the work needs to be contracted to an external vendor who has the necessary expertise to deliver what is needed for the project. You are in the process of selecting a vendor. What process group are you in?
  - a. Planning
  - b. Initiating
  - c. Monitoring and Controlling
  - d. Executing



17. All the following happen in the Initiating process with the *exception* of:
- Choose the project team
  - Determine stakeholders
  - Identify processes and standards
  - Create the project charter
18. You are deep in the planning process for your project and have created a human resource plan in which you have identified what skill sets are needed, when they are needed, and when they will roll off the project. You are now focused on the process of acquiring, developing, and managing the project team. Which of these processes occur in the monitoring and controlling process group?
- Acquire project team only
  - Manage project team only
  - Develop and Manage project team only
  - This is a trick question - none of them do
19. Within the Project Time Management knowledge area, in what order do the planning activities occur before you can develop the project schedule?
- Define activities, estimate activity duration, estimated activity resources, sequence activities
  - Define activities, estimate activity resources, sequence activities, estimate activity duration
  - Define activities, sequence activities, estimate activity resources, estimate activity duration
  - Define activities, estimate activity duration, sequence activities, estimate activity resources
20. One of the Junior Project managers you're mentoring has come to you for help. She just started the planning process and sat down with the key stakeholders to begin the requirements collection activities for her project. At the end of the meeting the stakeholder who will be receiving the deliverable stated that he wanted to see a definitive budget estimate for the project within one week of the completion of the requirements collection process. She explained that might not be possible because the team will not have had enough detail at that point to construct a solid estimate. He said he didn't care and that he needed the estimate for the capital budgeting meeting that is occurring at the end of the month - two weeks from now. What is the *best* advice you can give your Junior Project manager?
- Take your best guess and double it. Since it is too early in the project to deliver a definitive estimate you tell the stakeholder this is the best estimate you can come up with at this point
  - It is not possible to deliver a definitive estimate until the planning process is complete. The best you can do at this point is a rough order of magnitude estimate
  - Escalate the issue to senior management as the stakeholder is obviously delusional
  - Sit down with the delivery organization, work through the weekend if you have to, and come up with the closest estimate you can deliver.
21. Where do lessons learned activities occur?
- In between the monitoring and controlling process and the closing process
  - Whenever there is an issue identified that needs to be addressed
  - In each phase-end closing process as well as the closing process at the end of the project
  - Only at the end of the project
22. What is a synonym for 'progressive elaboration'?
- Cyclical planning
  - Quantified elaboration
  - PERT estimates
  - Rolling wave planning
23. You are managing a program to recruit new project managers for your organization. You have just completed a training session in which you have identified the five process groups in the PMI® framework

and just asked the class the following question: “What is the purpose of the initiating process group?” Which of the student responses was the *best* answer?

- a. Initiating kicks off the project
  - b. Initiating can kick off the project or a phase of the project
  - c. Initiating can kick off a project, a project phase, or contract
  - d. Initiating identifies the project manager and produces a project charter
24. What is the key primary benefit of the monitoring and controlling process group?
- a. It manages the change request process
  - b. It plays a key role in measuring and managing procurement activities for the project
  - c. You can observe project performance, measure it, and identify variances from the project management plan
  - d. Insures, through metrics and measurement, that changes to the project management plan are prevented to eliminate scope creep
25. In an organization that uses 'hit or miss' project processes, they have come to you for advice on which of the five PMI® process groups would be the best one to implement, if they had to boil it down to just one. What is the *best* advice you could give them?
- a. Executing processes would serve you best
  - b. Planning processes would serve you best
  - c. Initiating processes would serve you best
  - d. Monitoring and Controlling processes would serve you best
26. You are a project manager in an organization with a strong PMO. One of the newly hired project managers told you that he has been a PMP® since 1998. While perusing the PMI® website looking for some standards documentation, you happen to do a lookup on this person and find out that they are not in the PMI® repository of PMP®s in good standing. What do you do?
- a. Call law enforcement and report the individual
  - b. Report the individual to PMI®
  - c. Report the individual to his senior manager
  - d. Report the individual to the PMO
27. Raw observations and measurements taking during the performance of project activities is defined by PMI® as \_\_\_\_\_?
- a. Work performance information
  - b. Work performance data
  - c. Work performance report
  - d. Work performance criteria
28. Processes that provide the project team with insight into the health of the project and identifies any area requiring additional attention are performed in \_\_\_\_\_.
- a. Planning
  - b. Initiating
  - c. Executing
  - d. Monitoring and Controlling

## Chapter 3 – Test Answers

1. C – The process groups are not project lifecycle phases. *PMBOK® Guide*, 5th edition, p. 52
2. B – While answers A, C, and D are partially correct, the purpose of the initiating process group is to align stakeholder expectations with the project's purpose. *PMBOK® Guide*, 5th edition, p. 54
3. D – Monitoring and controlling is the only correct answer. *PMBOK® Guide*, 5th edition, p. 61
4. A – Executing is the only correct answer. *PMBOK® Guide*, 5th edition, pp. 56
5. D – Identify stakeholders is part of the Initiating process
6. C – In *PMBOK® Guide*, 5th edition, p. 48
7. B – Integrated Change Control is the only correct answer. *PMBOK® Guide*, 5th edition, p. 57
8. D – This is the only correct answer. *PMBOK® Guide*, 5th edition, p. 54
9. C – In phase gated process, when the planning work is completed and signoffs are received, we are looking for a go/no go decision from senior management
10. D – Validating deliverables is in the monitoring and controlling process group occurring in the Validate Scope process
11. B – Closure occurs at phase-end and project end activities
12. A – Information distribution and performance reporting both occur in the Executing process group. *PMBOK® Guide*, 5th edition, p. 301
13. B – Risk assessment is the only remaining knowledge area that was not covered
14. A – Lessons learned are not used to torpedo resources you had issues with or steer you away from uncomfortable projects. They usually focus on performance and process improvement
15. D – Only a well documented project management plan (which includes the entire scope baseline) would help to organize the work
16. D – Vendor identification and selection occurs in the Executing process group. *PMBOK® Guide*, 5th edition, p. 356
17. A – Choosing the project team is an Executing group activity. *PMBOK® Guide*, 5th edition, p. 267
18. D – It is a trick question; there are no processes in the Human Resources knowledge area that fall into the Monitoring and Controlling process group
19. C – Define activities, sequence activities, estimate activity resources, estimate activity durations is the correct sequence. *PMBOK® Guide*, 5th edition, p. 61
20. B – Your job is to give management a reality check, not feed in to a management wish- fulfillment fantasy or turn yourself and the team inside-out attempting to meet an impossible demand. This eliminates answers A and D. Answer C is something you might wish to say 😊, but will always be wrong on the exam...
21. C – Lessons learned occur when ever the closure process occurs: phase-end or end of project
22. D – Rolling wave planning is the correct answer. A and B are non-existent terms and PERT is used for schedule estimating
23. B – This is the most inclusive answer. A and D are both true but not complete. C is a red herring. *PMBOK® Guide*, 5th edition, p. 44 “The Initiating Process Group consists of those processes performed to define a new project or a new phase of an existing project by obtaining authorization to start the project or phase”
24. C – *PMBOK® Guide*, 5th edition p. 57
25. B – All the processes are important, but they all depend on Planning
26. B – Report the individual to PMI®. The PMP® credential is issued by PMI®, not your organization. Answer A is a red herring. Answers C and D, while seemingly appropriate, miss the point: the credential comes from PMI®
27. B – This is the definition of work performance data. *PMBOK® Guide*, 5th edition p. 59
28. D – This identifies a monitoring and controlling process. *PMBOK® Guide*, 5th edition p. 57

# Chapter 4 : Project Integration Management

Knowledge Area Processes:

- ▶ Develop Project Charter
- ▶ Develop Project Management Plan
- ▶ Direct and Manage Project Work
- ▶ Monitor and Control Project Work
- ▶ Integrated Change Control
- ▶ Close Project

## Section Objectives

At completion you will know how to:

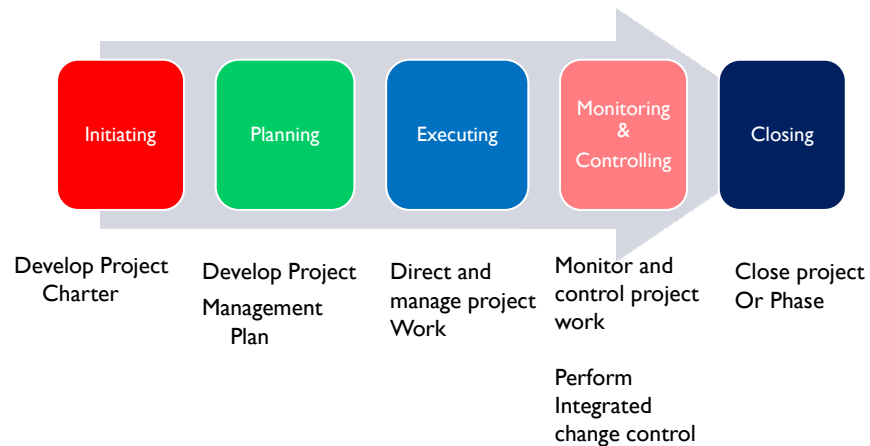
- ▶ Organize Integration management processes into the PM process groups
- ▶ List the elements and purpose of a project charter
- ▶ Describe the two fundamental project selection techniques
- ▶ Define a PMI®S and its two key components
- ▶ List the components and importance of a project management plan
- ▶ Describe the components and importance of a change control system and a configuration management system
- ▶ Perform steps needed to implement changes

## Integration Process Summary

The high level Project Integration Management outputs, by Process Group are:

Initiating	Planning	Executing	Monitoring and Controlling	Closing
-Project Charter -Select project manager	PM Plan	-Deliverables -Work Performance information -CR's	-CRs -Work performance reports	Final Product
			Approved CR's Change log	OPA Updates

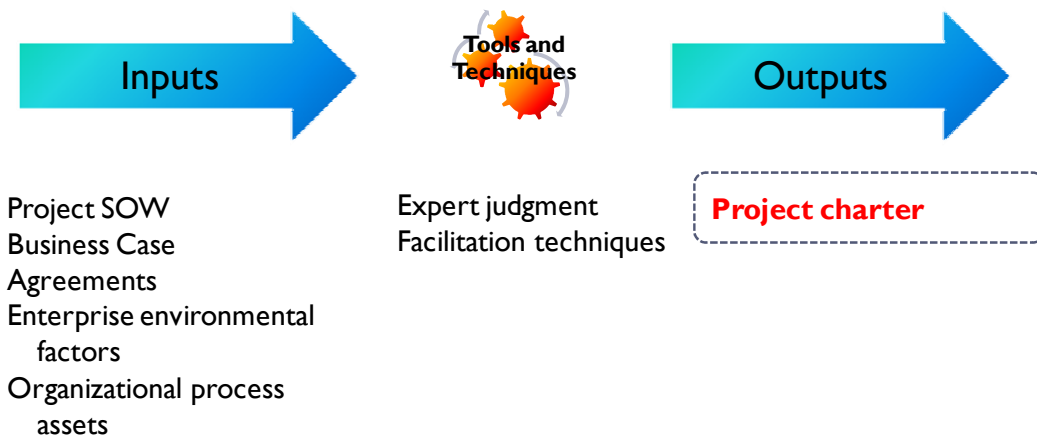
## Project Integration Management



For the purposes of the exam it is important to know both the process areas within the Project integration management knowledge area, and which project management process group each of the processes fall into:

Process	Process Group
Develop Project Charter	Initiating
Develop Project Management Plan	Planning
Direct and Manage Project Work	Executing
Monitor and Control Project Work	Monitoring & control
Perform Integrated Change Control	Monitoring & control
Close Project or Phase	Close

## Develop the Project Charter



Redrawn from the *PMBOK® Guide* <sup>15</sup>

Contrary to how many businesses do this, a project charter is a brief two or three page document (at most) that imparts high-level information about the project: The project description, project manager and their authority level, a high-level business case, stakeholders, high-level deliverables list, high-level project risks, defined project objectives, project approval requirements and formal sign off are all part of the project charter. Projects are initiated by someone external to the project such as a sponsor or other management function (e.g. portfolio manager, PMO, VP, etc.)

In one sense, the project charter functions as an excellent executive summary of the project. For the exam, know that a charter is a required element that must be completed and signed off before further project work can begin.

## Charter Elements

Key charter benefits - elements for the exam:

- Formally recognizes existence of the project
- The PM is authorized to spend money and commit resources to the project (most commonly described benefit)
- Describes high-level requirements
- Links the project to other work in the organization

The charter elements may include, but are not limited to:

- ▶ Project title
- ▶ Project manager assigned and authority level
- ▶ Business need

<sup>15</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, Page 65

- ▶ Project justification/business case
- ▶ Initial resources pre-assigned
- ▶ Stakeholders
- ▶ Initial scope and requirements
- ▶ Project/product description and deliverables
- ▶ Initial constraints and assumptions
- ▶ May include S.M.A.R.T. goals (Specific, Measurable, Agreed, Realistic, Time-bound)\*
- ▶ High level budget estimate
- ▶ Sponsor Signature/signoff

\*There are many variants on the SMART acronym. A few appear below<sup>16</sup>:

**S** - specific, significant, stretching

**M** - measurable, meaningful, motivational

**A** - agreed upon, attainable, achievable, acceptable, action-oriented

**R** - realistic, relevant, reasonable, rewarding, results-oriented

**T** - time-based, timely, tangible, trackable

## Project Statement of Work

The project SOW is a high-level description of the products or services the project will create. It is usually created by the customer/sponsor.

Fundamental elements of an SOW:

- Business need
- *Product* scope description
- Strategic plan

Usually a summary if the work is being performed internally – the detail is developed in the WBS

For external services procured, the SOW is called the 'Procurement Statement of Work' (Details will be addressed in Section 12 on Procurement)

In regards to the project charter, the Project Statement of Work is more of a high-level summary. According to PMI®, it is a narrative that describes products or services that are delivered by the project. (*PMBOK® Guide*, 5th edition, p. 75). For an internal project, work is actually detailed in the work breakdown structure (WBS) and the WBS dictionary. The Project Statement of Work references:

- Business need
- Product scope
- Strategic plan

A *contractor* procurement statement of work is a legal document that requires a legal review and review by contract administration professionals. Contract statements of work can run many thousands of pages on a large project, and legally obligates the vendor to deliver exactly what is in the contract

<sup>16</sup><http://www.projectsmart.co.uk/smart-goals.html>, Duncan Haughey, PMP

statement of work. Details on the contract statement of work will be addressed in the Project Procurement Management section (Section 12).

## Business Case

The business case, in its most simple terms, tells us why the business organization is attempting the project at all. It is usually completed by a business analyst and includes the business need as well as the cost-benefit analysis. PMI® states the business case is created due to one or more of the following:

- Market demand
- Organizational need
- Customer request
- Technological advance
- Legal requirement
- Ecological impact
- Social need

## Agreements

An agreement can take the form of a contract, service level agreement (SLA), letter of agreement (LOA), letter of intent (LOI), or a memorandum of understanding (MOU). Contracts are usually employed when the project is undertaken for an external customer.

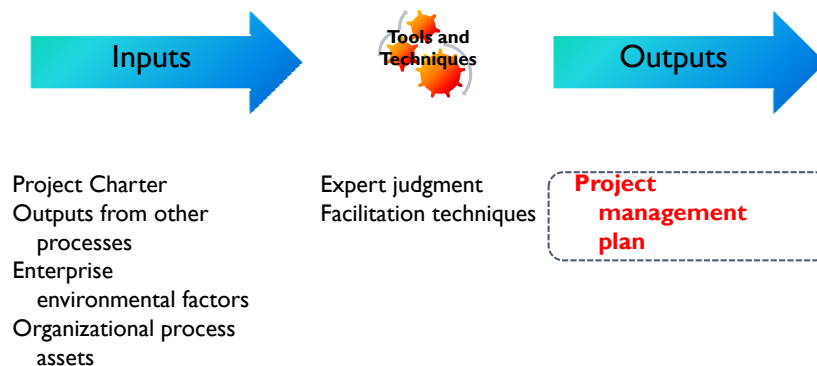
## Additional Financial Terms

Know what these terms mean for the exam:

- **Sunk costs** – what you have spent. Should not be considered when deciding whether to continue with a troubled project
- **Law of diminishing returns** – the more you put in, the less you get in return
- **Working capital** – assets minus liabilities; what the company has to invest in projects
- **Depreciation** – know these for the exam
  - Straight-line depreciation
  - Accelerated depreciation
    - Double declining balance
    - Sum of the Years Digits
- **Categories of cost**
  - \_\_\_\_\_ – attributable to the project
  - \_\_\_\_\_ – overhead items shared by multiple projects
  - \_\_\_\_\_ – costs that change with the level of effort
  - \_\_\_\_\_ – rentals/leases
- **Economic value added:** added value produced by the project above the costs of financing the project



## Develop the Project Management Plan



Redrawn from the *PMBOK® Guide* <sup>17</sup>

Notice that the Project charter as well as organizational process assets (how the organization does projects) and enterprise environmental factors (what the organization is like) are the major inputs to the creation of the project management plan.

The project management plan essentially defines how you will execute, monitor and control, and close the project. When the project management plan is complete, it requires signoff by all key stakeholders on the project.

A critical element to remember is that the project management plan is not 'etched in stone'. If the project is managed as PMI® recommends, as a progressive elaboration, adjustments to the project management plan will occur as the team learns more about the project - it is developed through all the integrated processes until the project is closed.

## Project Management Plan Defined

- Always written out - *NOT* an MS Gantt chart (!)
- A repository for subsidiary plans needed for the project
- Created by the PM with input from stakeholders
- A formal document approved by designated stakeholders
- Progressively elaborated

The project management plan integrates all of the Knowledge Areas into a unified whole and serves as a repository for the subsidiary plans in the remaining knowledge areas. However, this does not mean that all the subsidiary plans are always used on every project. PMI® clearly states:

<sup>17</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, Page 65

**“Project managers and their teams should carefully address each process and its inputs and outputs and determine which are applicable to the project they are working on... This effort is known as tailoring.”<sup>18</sup>**

The project management plan represents a consolidation of all the subsidiary management plans from all the other process groups as well as from Integration Management. Subsidiary plans can include the following:

- Scope management plan
- Requirements management plan
- Change management plan
- Configuration management plan
- Schedule management plan
- Cost management plan
- Quality management plan
- Process improvement plan
- Human resource plan
- Communications management plan
- Risk management plan
- Procurement management plan

## Why the Project Management Plan Is Needed

- Defines the life cycle selected for the project
- Details the tailoring decisions made by the PM team used to manage the specific project, including the dependencies and interactions among those processes, implementation levels, tools and techniques and the essential inputs and outputs
- How work will be executed to accomplish the project objectives
- How changes will be monitored and controlled
- How configuration management will be performed
- How integrity of the performance measurement baselines will be maintained and used
- The need and techniques for communication among stakeholders
- The selected project life cycle and, for multi-phase projects, the associated project phases
- Key management reviews for content, extent, and timing to facilitate addressing open issues and pending decisions

Bullet points above described some of the major reasons why the project management plan is needed on a project; however there are several other critical reasons why you need a documented project management plan:

1. If there are changes to the project, that information will need to be captured in the plan. Changes may necessitate a change in direction or possibly a change in the schedule, budget, or scope of the project.

---

<sup>18</sup>Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p 48

2. Capturing versions of the project management plan as the project changes can help identify trends or issues as the project management plan is executed.
3. Most importantly of all, the documentation is key to understanding what we did, why we did it, and, in the case of issues, what we did to correct problems.
4. Last and most simple is this: **if it is not written down it doesn't exist**. On a large project with many complexities it would be careless and unprofessional to trust critical project elements to memory. A formal written record is essential if we are to evaluate our actions and whether they were successful or not. "How can you fix the problem if you don't know what's broken?"

## Project Management Plan Components

- Baselines for cost, schedule, and scope
- Scope statement
- WBS (work breakdown structure)
- Cost estimates, schedule, and responsibility (ownership) for each deliverable
- Performance measurement baselines
- Staff requirements with cost estimates
- Subsidiary management plans for scope, schedule, cost, quality, communications, risk, configuration management, change management, requirements management, process improvement and procurement

Bullet points listed above describe some of the major components in a generic project management plan, however there are a number of other components that can be included. For example, on a software project, you might consider the following additional elements to include in your project management plan:

- Management philosophy
- Development philosophy
- Waivers
- Services
- Non-deliverable products
- Computer systems support
- Peer reviews
- Test philosophy
- Training needs
- Automated aids
- And others...

"The project management plan integrates and consolidates all of the subsidiary management plans and baselines from the planning processes..."<sup>19</sup>

---

<sup>19</sup>Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p. 81

## Project Documents

There are a series of project documents that are used to help manage the project. These documents are not part of the project management plan but are frequently created and updated throughout the project.

**Exam Tip:** Knowing where these documents are created (knowledge area), the process where they are utilized, and whether they are inputs or outputs (or potentially both!), will give the PMP® credential seeker an excellent overview for the exam. Be able to identify each of these documents and where they exist as inputs and/or outputs by knowledge area and process as well as process group:

- |                                  |                                     |                                    |
|----------------------------------|-------------------------------------|------------------------------------|
| ▶ Activity attributes            | ▶ Procurement SOW                   | ▶ Requirements traceability matrix |
| ▶ Activity cost estimates        | ▶ Project Calendars                 | ▶ Resource breakdown structure     |
| ▶ Activity duration estimates    | ▶ Project charter                   | ▶ Resource calendars               |
| ▶ Activity list                  | ▶ Project funding requirements      | ▶ Risk Register                    |
| ▶ Activity resource requirements | ▶ Project schedule                  | ▶ Schedule data                    |
| ▶ Agreements                     | ▶ Project schedule network diagrams | ▶ Seller proposals                 |
| ▶ Basis of estimates             | ▶ Project staff assignments         | ▶ Stakeholder register             |
| ▶ Change log                     | ▶ Project SOW                       | ▶ Team performance assessments     |
| ▶ Change requests                | ▶ Quality checklists                | ▶ Work performance data            |
| ▶ Forecasts                      | ▶ Quality control measurements      | ▶ Work performance information     |
| ▶ Issue log                      | ▶ Quality metrics                   | ▶ Work performance reports         |
| ▶ Milestone list                 | ▶ Requirements documentation        |                                    |
| ▶ Procurement documents          |                                     |                                    |

## Baselining the Project Management Plan

The project plan is baselined:

- When all stakeholders have completed and signed-off on all the elements in the Project Planning Phase
- The baseline is the starting point by which all subsequent changes to the project are measured
  - The baseline represents the starting point of **progressive elaboration** activities
  - Critical for managing change against the reality of the project
  - Also key in defining Lessons Learned at the phase/project close
  - Once the PMP® is baselined, is it subject to formal change control

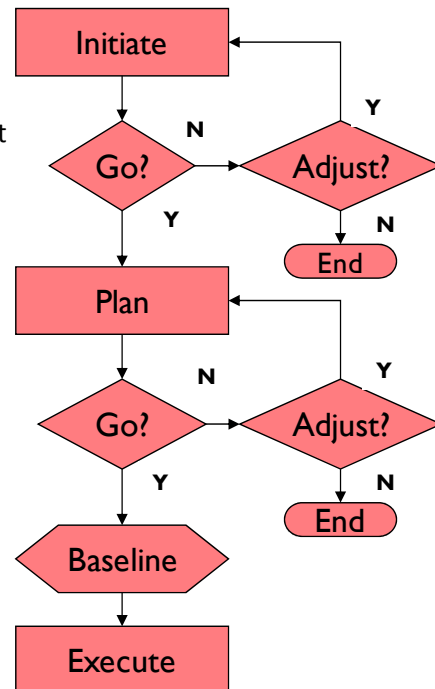
The graphic below shows a generic phase-gated process for baselining a PM plan.

Once the project management plan is complete and all the stakeholders have signed off project management plan, the project management plan is 'baselined'. This means that we use the baselined project management plan as a yardstick against which we measure all subsequent changes to the plan. This information is captured in the performance measurement baseline(PMB):

“The performance measurement baseline is an approved scope-schedule-cost plan for the project work against which the project execution is compared to measure and manage performance. The PMB includes contingency reserve, but excludes management reserve ”<sup>20</sup>

If there are significant changes to the project management plan - for example if there are major discovery elements that add significant scope, time, and budget to the plan - we can re-baseline the project management plan to accommodate those changes. Re-baselining the project management plan generally means that we are working to a new completion date, additional budget and sometimes additional scope elements as well.

If we are applying the project management life cycle for each phase of the project, we can capture lessons learned at the end of each phase and enter these elements in the project management plan as the plan is progressively elaborated.



## Configuration Management

- A key element in the project plan that works hand in hand with the change control system
- Used to document all versions of:
  - Project documentation
  - Schedule
  - Scope
  - Deliverables (hardware, software, etc)
  - Completed project components

All this information is contained in the PMIS (Project Management Information System) – an EEF

Configuration management is a key element for both manufactured product as well as software products. As various versions of products are released in the marketplace due to improvements or corrective action, the configuration system must capture these changes so that the customer receives the correct version of the product at all times.

<sup>20</sup>Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, p 549

Failing to keep a proper configuration file on a 15,000 BTU air conditioner and installing a replacement for a failed capacitor might cause the air conditioner to catch fire (or explode!) upon startup, if the configuration file does not reflect the correct hardware list for that specific model of air-conditioner.

Sending an incorrect software patch to a customer for a specific version of software could cause the software to fail catastrophically, if the software configuration system is not keeping track of the specific version of the software, and all concomitant components being used by the customer.

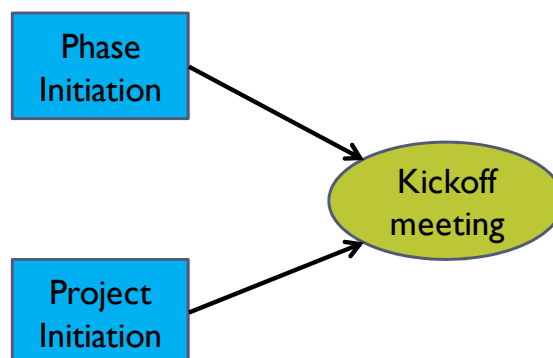
## Project Management Information System (PMIS)

The PMIS includes:

- ▶ The Configuration Management System
  - Identifies and documents the functional and physical characteristics of a product or component
  - Controls any changes to such characteristics
  - Records and reports each change and its implementation status
  - Supports the audit of the products or components to verify conformance to requirements
- ▶ The Change Control System
  - The change control system is a collection of formal documented procedures that define how project deliverables and documentation are controlled, changed, and approved
  - The change control system is subsumed within the configuration management system- while the change control system tracks approved and rejected changes, the approved changes become part of the product and, as such, are maintained in the configuration management system.

The PMIS is usually an automated system, although it can also be manual. It is used by the project management team to support generation and versioned storage of all project documents and subsidiary documents feeding the PM Plan.

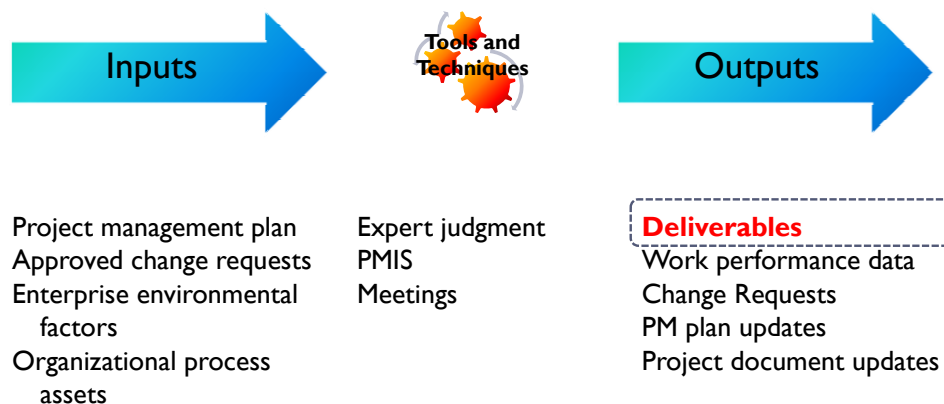
## Project Kickoff Meeting



The kickoff meeting is called by the project manager and formally introduces the project team and all stakeholders to the project.<sup>21</sup> Optimally, it is best if the kickoff meeting can be held face-to-face with all participants. Due to the distributed nature of teams in the current business environment, this is not always possible. Therefore it is strongly recommended that use of videoconferencing or minimally conference calls with electronic support can be viable alternatives. Kickoff meetings can also occur at the beginning of project phases as well as at different levels in the organizational hierarchy e.g. business kickoff meeting, technical kickoff meeting, infrastructure kickoff meeting, etc. Some of the elements that need to be established in the kickoff meeting include, but are not limited to:

- **Project Review** - review the high-level details of the project including project risks, approximate schedule, approximate budget, high level scope, project constraints or any other required element.
- **Responsibility Assignment Matrix** - for any issues or risks that come up in the project a responsible party will need to be identified along with a due date for resolution.
- **Participation of Key Stakeholders** - it is important to determine upfront what kind of information your stakeholders need, when they need it, how frequently, and in what format
- **Escalation Path** - in the event there are project issues beyond the control of the project manager or the immediate performing organization, a clear escalation hierarchy for problems is required.
- **Frequency and Need for Meetings** - establish immediately the frequency of team meetings and their necessity. Status can be handled via e-mail or posted on an intranet - it may not require valuable team time to hold a meeting simply to report status. Also, decide the criteria for conducting a meeting.

## Direct and Manage Project Work



Redrawn from the *PMBOK® Guide* <sup>22</sup>

This process performs the work described in the project management plan to achieve the project objectives. This includes managing the schedule, the budget, scope, quality, communications, human resources, risks, and procurements for the project. Because the primary job of the project manager is an integration function, we must keep all the knowledge areas constantly in mind throughout the project.

### Exam Tip:

<sup>21</sup> [www.cioarchives.ca.gov](http://www.cioarchives.ca.gov), 1997.

<sup>22</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, Page 65

Change requests can include preventive actions, corrective actions or defect repairs. Keep this in mind as change requests are a frequent output of most Executing and Monitoring & Controlling processes.

## Project Execution Actions

- Staff, train, and manage the project team members assigned to the project
- Obtain quotations, bids, offers, or proposals
- Select sellers by choosing from among potential sellers
- Implement the planned methods and standards
- Create project deliverables
- Manage risks and implement risk response activities
- Manage sellers
- Adapt approved changes into the project's scope, plans, and environment
- Establish and manage project communication channels, both external and internal to the project team
- Collect project data and report cost, schedule, technical and quality progress, and status information to facilitate forecasting
- Collect and document lessons learned, and implement approved process improvement activities

One of the key aspects of Direct and Manage Project Work involves the implementation of the approved changes. These changes usually fall into one of the following four categories:

- **Corrective action.** Designed to bring future project work in line with the project management plan.
- **Preventive action.** Designed to reduce the probability of a negative result associated with project risks
- **Defect repair.** Designed to detect any defect in a project process or component with recommendations to repair and or replace the process or component
- **Updates.** Changes to project documents

**Work Performance Information:** Can be an input or an output. Typically addresses:

- Deliverable status
- Schedule progress
- Costs incurred

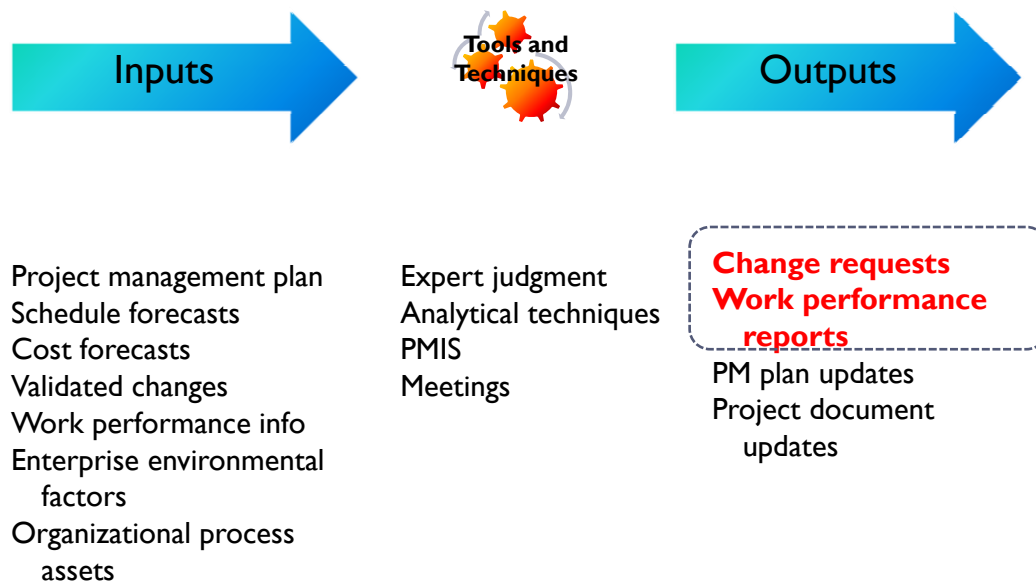
Other concepts that may be covered in the exam but not covered in the *PMBOK® Guide*, 5th edition are the concepts of “Ensuring Common Understanding and Being of Service”.

**Ensuring Common Understanding** means that the project manager ensures everyone is kept up to date on all management plans, project schedules, elements that are in or out of scope, and more. In short it means 'keeping the project team and the stakeholders on the same page'.

**Being of Service** means the project manager assists the team to help find solutions to problems, facilitating technical meetings, removing roadblocks to project work, and others. In short it means 'how can I help you'.



## Monitor and Control Project Work



Redrawn from the *PMBOK® Guide* <sup>23</sup>

The monitor and control project work process is one that is done from the beginning of the project through the close of the project. It not only applies to the project at a macro level, but it also applies to each phase of the project as one of the five basic project management life cycle process groups. For the exam, understand that when the subject is discussed, you need to be able to put it in context. It could be referencing one of the five process groups OR monitoring and controlling within the Integration process.

Analytical Techniques can include: Regression analysis, grouping methods, multiple equation models, FMEA (Failure Modes and Effects Analysis), reserve analysis and trend analysis.

## Corrective Action

Any action needed to bring future project performance in line with the project management plan is called a corrective action. The three basic steps of Corrective Action:

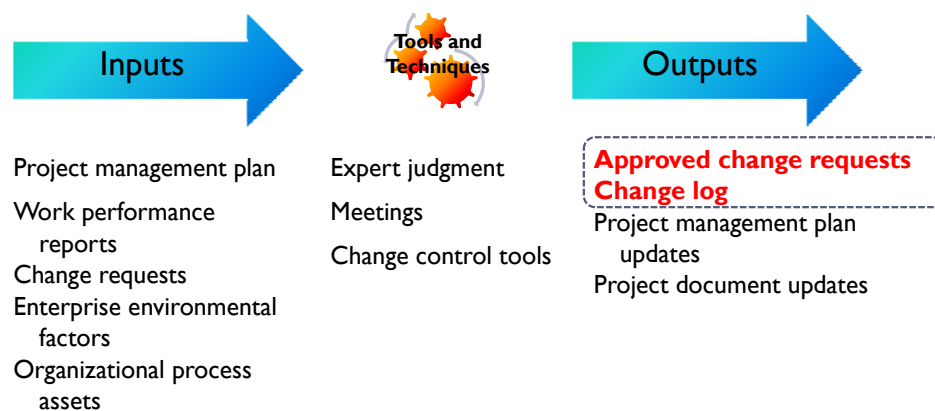
- Identify the need to take corrective action
- Take corrective action
- Measure the result to determine if additional action is necessary

Corrective actions, preventive actions, and defect repair are recurring themes throughout the *PMBOK® Guide*, 5th edition. The key aspects of these actions for the purpose of the exam, appear below:

<sup>23</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, Page 65

- \_\_\_\_\_ **Actions.** This presumes you have metrics in place and that you are using these metrics to evaluate the current state of your project against the project management plan. You must be able to seek out root causes of issues and identify potential triggers that will let you know when the project is heading off track. Once the correction is implemented, you need to have measurement tools in place that will validate the effectiveness of the corrective action.
- \_\_\_\_\_ **Actions.** These actions can occur as a result of implementing a corrective action. The focus here is on implementing process controls that will obviate the need for a future corrective action.
- \_\_\_\_\_ . According to PMI®, defect repair is included in PMI®'s definition of *Rework*: "Action taken to bring a defective or nonconforming component into compliance with requirements or specifications."<sup>24</sup> **PMI strongly promotes defect prevention over defect repair.** The primary issue with defect repair is that there are only two options when considering defect repair:
  - **Rework.** The output does not meet the project specifications and needs to be brought back into compliance. Rework is always more expensive than preventive action.
  - **Scrap.** This represents the total loss of the work investment and is the most expensive of any of the previous actions

## Perform Integrated Change Control



Redrawn from the *PMBOK® Guide* <sup>25</sup>

Integrated change control is one of the more challenging areas in the exam. There can be up to 20 questions on the subject, so it is important that you grasp the concepts. The area is important because it impacts all aspects of your project; from the scope, timeline, and budget to the quality, human resources, risks and procurement aspects of the project.

It involves the processes for reviewing change requests, approving or rejecting change requests and managing changes into deliverables. Integrated change control also involves reviewing requests for changes or modifications to project documents as well as deliverables, baselines, or the project management plan.

<sup>24</sup>24 Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Fifth Edition, Project Management Institute, Inc., 2013, p. 559

<sup>25</sup>25 Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide)* – Fifth Edition, Project Management Institute, Inc., 2013, Page 65

There have been a number of studies done on software projects that show that a change in a project to correct a defect at the unit testing level, which costs a dollar, can cause the business up to 1000 times that amount if the defect is missed in user acceptance testing and actually delivered to the customer.

Key reasons for excessive changes on a project are due to, but not limited to, the following:

- Missed requirements
- Failing to engage a key stakeholder at the start of the project
- Stakeholder misunderstanding on what the project is designed to deliver
- A poorly designed WBS
- Inadequate risk assessment

**Exam Tip:** Work performance information is a frequent input to most M&C processes across the 10 knowledge areas.

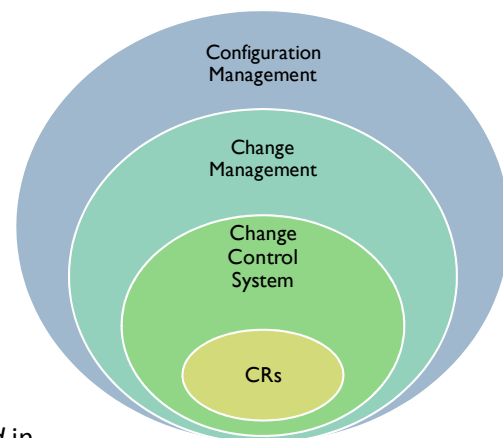
## Change Requests and Configuration Management

Project changes must be tracked using a formal change management process. These changes also impact your configuration system and the configuration of the project's product. The graphic below shows where change requests sit in the configuration hierarchy. Ensure that you:

- **Identify the configuration items** - labeling and tracking of the configuration items
- **Implement configuration status accounting** - all appropriate data about the configuration item, including status to propose changes and the implementation status of approved changes
- **Perform a configuration verification and audit** - validation that the configuration item has been registered, approved, tracked, and correctly implemented

The steps needed to implement change:

- Identify actual need for change
- Impact assessment: cost, time, resource availability
- Identify change and response alternatives
- Create a documented CR (change request)
- Meet with internal stakeholders
- Meet with the customer, if required
- Submit to change control board (CCB) for ultimate approval (optional if no CCB exists)



**Exam Tip:** Changes can be *requested* by Executing or Monitoring &Controlling processes, *approved or rejected* in Integrated Change Control, or *implemented* by Executing processes. **Corrective and preventive actions do not usually affect the project baselines; only the performance against the baselines.**

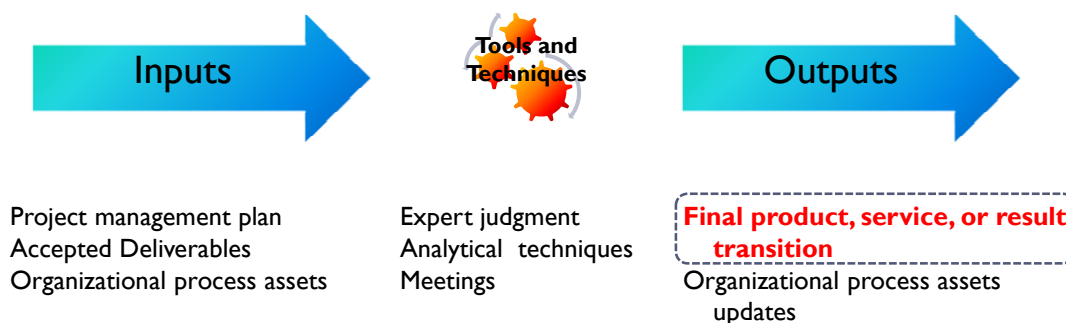
Executing	Monitoring and controlling
Change requests	Change requests
Implement change request	Approve or reject changes

## Who Authorizes Changes? Quick Quiz...

- ▶ Changes to the Project Charter?
- ▶ Changes to the Performance baselines?
- ▶ Changes to the High Level Constraints?
- ▶ Changes to the Project Plan?

NOTE: While the selections above do not represent every situation, they generally represent change authority levels on a large project.

## Close Project or Phase



Redrawn from the *PMBOK® Guide* <sup>26</sup>

The key element in this section is obtaining formal acceptance to close out the project phase or the entire project. Key elements to remember them in project or phase closure are the following:

- Validate the work was done to requirements for the phase or project
- Formal acceptance of the phase or project
- Complete all performance reporting for the phase or project
- Close any outstanding procurement contracts for the phase or project, if applicable
- Document and archive lessons learned for the phase or project
- Delivery of product increment or product for the phase or the project
- Specific updates to the organizational process assets include: project files, project or phase closure documents and historical information

<sup>26</sup> Project Management Institute, *A Guide to the Project Management Body of Knowledge, (PMBOK® Guide) – Fifth Edition*, Project Management Institute, Inc., 2013, Page 65

Understand what the first sentence means - that administrative closure occurs not only at the end of the project, but also at the end of the specific *phase* of your project. Administrative Closure will also occur if the project is abruptly terminated.

## Administrative Closure Activities

The high level steps in administrative closure of a project consist of:

1. Perform product verification
2. Complete final project performance reporting
3. Obtain formal acceptance of project
4. Perform lessons learned
5. Create project archives
6. Release resources
7. Celebrate!

Administrative closure can occur at the end of a project phase or at the end of the project itself. Administrative closure will be performed if the project is abruptly terminated for whatever reason. In any case, the following steps are part of administrative closure activities:

- Perform a product verification in order to satisfy the exit criteria for the phase of the project or the project itself
- Outline via a documented process, all the actions and activities necessary to perform a handoff of the product or service to production or operations management
- Complete and archive any final project performance reporting, which can include; phase records, lessons learned, whether the project met success criteria, etc.
- Gain formal acceptance of the project via a formal sign off from all designated stakeholders. If there were procurement activities within the project or the phase, ensure all procurement documentation signoffs have occurred prior to administrative closure

## Contract Closure

The high level steps in the contract closure process consist of:

1. Perform product verification
2. Complete final contract performance reporting
3. Conduct procurement audits
4. Complete formal contract acceptance
5. Create a contract file

Contract closure occurs prior to administrative closure on a project. Why do you think this is the case?

- a. It is a Gartner Group best practice for project management
- b. Who will work on the contract if you close the project before the contract?
- c. It gives the vendor time to submit final bills before the project closes
- d. It gives the project manager one less thing to think about before closing the project

One of the more important aspects of contract closure is to perform a procurement audit of the final result. This requires a careful review of the contract statement of work and all of the deliverables.

The procedures for procurement contract closure are very similar to those of administrative closure with one or two differences:

- An evaluation of vendor performance on a contract may result in additional fees being paid to the vendor for outstanding performance. The incentive criteria are usually documented at the beginning of the procurement so that the vendor understands what they have to do to secure an incentive fee.
- If there are any outstanding claims against the vendor or the buyer due to disagreements or different interpretations of the statement of work - these elements must be resolved prior to contract closure.

## Lessons Learned

Make sure Lessons Learned are reviewed at the end of each project phase and ask:

- What's working?
- What's not working?
- What still puzzles us?
- Where can we improve our performance and what improvements can we implement?

Final Lessons learned at the project close can be used to review:

- Did we effectively address project issues?
- How effective were our performance improvement efforts?
- What would we do differently the next time?
- What new processes need to be institutionalized to improve the project process?
- And more...

Most organizations perform a lessons learned activity at the end of the project - this is the *only* time they perform such an activity. The problem with this approach is that lessons learned collected at this point can never be applied to the current project; your project is already done...

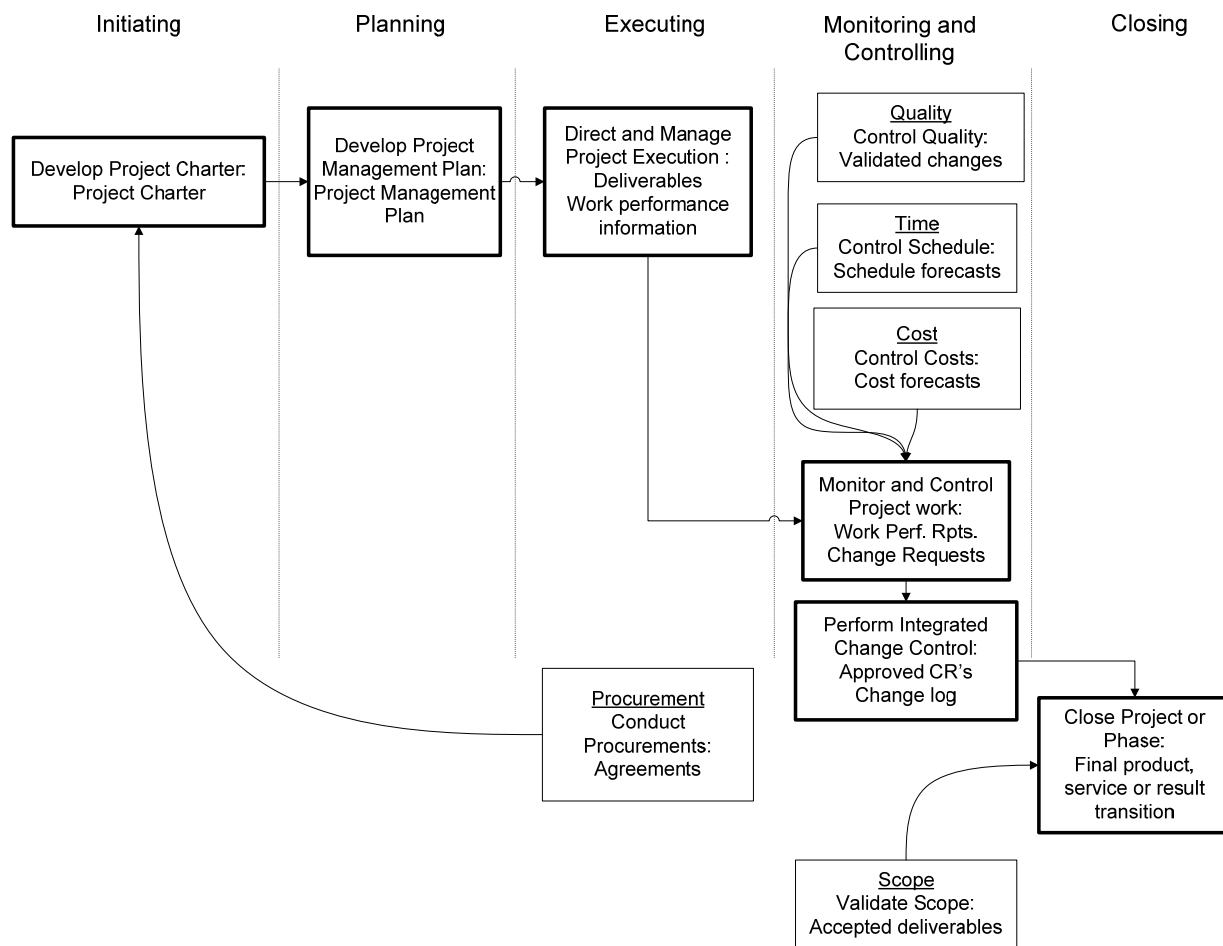
A key feature of the lessons learned activity is that, in a phase-gated process, it provides a checkpoint at which we can evaluate our progress to see how well we are performing and make adjustments moving forward. Elements that can be reviewed in a lessons-learned activity may additionally include some of the following:

- Why there were so many change requests and what can we do about it?
- Some stakeholders are very difficult to engage. This threatens certain project deliverables. What can we do better to engage them?
- Our unit testing needs improvement - let's identify activities and changes that can make it more effective.

A phase-end lessons learned review usually takes about an hour and can be of enormous benefit to the project team and stakeholders alike.

## Project Integration Management – Key Process Interactions

The key inputs from the other Knowledge Areas to Project Integration Management processes are shown below. *Know these process interactions for the exam.*



## In Summary...

This section discussed project integration management, including:

- ▶ The similarities and differences between a project charter and PM plan
- ▶ Work authorization systems
- ▶ Definition and importance of baselines
- ▶ The iteration of recommended, approved, and implemented actions
- ▶ Change request documentation and evaluation
- ▶ Authority to make changes
- ▶ The similarities and differences between administrative closure and contract closure

## Integration Process Check

Match up the definition with the process:

- |                                       |   |
|---------------------------------------|---|
| ___ Develop project charter           | A. The process of defining, preparing, and coordinating all of the subsidiary plans and integrating them into a comprehensive whole.  |
| ___ Develop project management plan   | B. The process of tracking, reviewing, and reporting project progress against the performance objectives defined in the project management plan   |
| ___ Direct and manage project work    | C. The process of developing a document that formally authorizes the existence of a project and provides the project manager with the authority to apply organizational resources to project activities |
| ___ Monitor and control project work  | D. The process of finalizing all activities across all of the project management process groups   |
| ___ Perform integrated change control | E. The process of leading and performing the work defined in the project management plan and implementing approved changes to achieve the project's objectives  |
| ___ Close project or phase            | F. The process of reviewing all change requests, approving changes and managing changes to deliverables   |



## Chapter Four Memory Check

1. \_\_\_\_\_ basically describe the organization's culture while \_\_\_\_\_ describe how the organization does projects
2. The key benefits of the project charter are;
  - a. \_\_\_\_\_
  - b. \_\_\_\_\_
3. The enterprise environmental factor (EEF) that ensures that the correct work gets done in the correct sequence is called a \_\_\_\_\_, while the EEF that keeps track of information storage and distribution in an automated fashion for the project is called a \_\_\_\_\_
4. Templates, historical data, lessons learned, and financial databases are all \_\_\_\_\_
5. Two forms of accelerated depreciation are known as \_\_\_\_\_ and the \_\_\_\_\_
6. The costs on a project that have already been expended are called \_\_\_\_\_
7. The four categories of costs you can experience on a project are: \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_
8. The key outputs of Direct and Manage Project Work are work performance information, change requests and \_\_\_\_\_
9. An action needed to bring future project performance in line with the project management plan is called a \_\_\_\_\_
10. Defect repair is another name for \_\_\_\_\_
11. One of the critical jobs of the project manager is to \_\_\_\_\_ unnecessary changes on the project
12. When performing closure on the project or a project phase \_\_\_\_\_ occurs before \_\_\_\_\_
13. The key output of Closure is the \_\_\_\_\_, \_\_\_\_\_ or \_\_\_\_\_

## Chapter 4 Test

1. The project has been running smoothly; initiation phase is complete and the team is working on all aspects of planning. You had meetings with stakeholders several times to collect requirements and as a result, requirements documentation is almost complete, as are high-level and detailed design documents. As construction begins on the project, several stakeholders have indicated the need for changes to the requirements set. They are claiming these elements were missed in the initial requirements collection process, and they want you to add these elements to the project immediately. You perform an impact assessment and get it back to them only to hear that they are not going to allow any changes in the project budget or the timeline to complete these additional elements. What is the most effective tool that you could use to prevent this instance of scope creep?
  - a. Change control system
  - b. Configuration management system
  - c. Murder Board
  - d. Work Authorization System
2. Which of the following is true about change requests that result in corrective or preventive actions?
  - a. They result in changes to scope
  - b. They result in changes to the project plan
  - c. They significantly increase risk
  - d. They do not usually affect project baselines
3. The project you are managing involves 11 different teams scattered geographically across the country. The project sponsor is worried about how the work of 11 non-co-located teams is going to be coordinated for the project. You assure the sponsor that all relevant documentation will be captured in the corporate PMI®S (project management information system). Within what key input does the PMI®S reside?
  - a. Project Management Plan
  - b. Enterprise Environmental Factors
  - c. Organizational Process Assets
  - d. Work Authorization System
4. The *most critical* activity of the project manager on the project is to:
  - a. Manage the project team
  - b. Protect the Project from unnecessary changes
  - c. Perform Integration
  - d. Create the project management plan
5. You are managing a high visibility project with an aggressive deadline. The team has been burning extra hours every week in order to bring in the project on time - everyone is tired and is looking forward to a break after the product is delivered to the client. The deliverable was finally completed and passed through user acceptance testing at your location without a hitch. The product was handed off to the installation team and the installation team installed the product at the client site. Unfortunately when they attempted to use the product, there was a major system crash that caused an abrupt halt in their production cycle. This installation represented a major upgrade from a previous installation of the same product, and while the first installation worked very well, this installation 'crashed and burned'. What is the *most likely* cause of the problem at the client site?
  - a. Adequate configuration controls were not observed
  - b. The project manager failed to control scope creep
  - c. User acceptance testing was flawed
  - d. The installation team did not install the software properly

6. All the following statements about Approved Change Requests are true *except* which of the following?
- Approved change requests are an input to Direct and Manage Project Work
  - Approved change requests are scheduled and implemented by the project team
  - Approved change requests are an output of the Direct and Manage Project Work process
  - Approved change requests can result in changes to the cost baseline, sequence of activities, resource requirements or changes to risk response alternatives (including changes to the project management plan)
7. You are working as a PMP® for a company that typically does not implement charters for projects. As a result, an unusually high number of projects in this organization fail on a yearly basis. You've just been placed on a high visibility project as the senior project manager and begin to work on elements of the charter with the project sponsor. Senior management doesn't understand why you're wasting your time on this activity. What is the *best* thing you can do in this situation?
- Tell PMI® about a fundamental breach in the PMI® framework
  - Review the benefits of a well-defined project charter with senior management
  - Refuse to take on the project as you know this will most likely result in a project failure
  - Continue to work on the charter with the project sponsor. Demonstrate to senior management, on completion of the charter, how this benefited the project and have the data and fact to back it up
8. The project management plan is complete and is ready to be baselined. However, a key stakeholder just discovered a critical omission and requests an adjustment to the PM plan. What should you do next as the project manager?
- Implement a formal CR
  - Make the adjustment
  - Consult the change control board
  - Inform the stakeholder that this constitutes scope creep and refuse to make the change
9. The project management plan is baselined when:
- The requirements and detailed scope statement are completed
  - Senior management has reviewed the project management plan via a gated process and given you a 'go' authorization to proceed with the next phase of the project
  - All the required stakeholders have signed off on it
  - The required business and technical reviews of the proposed solution have been verified and validated by all stakeholders
10. Senior management has asked for an update on your project's budget forecasts and deliverables. This information will be contained in:
- Work performance information
  - Status reports
  - Progress reports
  - Variance and trend analysis
11. Who can approve of changes to any of the primary constraints on your project such as scope, budget, or timeline?
- The Change Control Board
  - The sponsor
  - Senior management
  - Key stakeholders

12. All of the following actions occur in the Direct and Manage Project Work process *except* which of the following?
- Adapt approved changes into the project's plans
  - Collect and document lessons learned
  - Determine the project life cycle for the project
  - Staff, train, and manage project team members assigned to the project
13. One of the key activities in The Monitor and Control Project Work Process is to implement corrective actions to bring future project performance back in line with the project management plan. What is the *best* explanation regarding PMI®'s philosophy on defect repair?
- It is considered rework
  - Defect repair is essential to bring nonconforming elements in the project back in line with performance standards
  - It is a nonessential corrective action due to missed requirements
  - It is most effective when it works hand-in-hand with inspection processes
14. You represent one of five project teams that are sharing a facility to deliver a high visibility project for your organization. Since you are sharing a facility, your teams share the expenses for heat, light, electricity, and technical support. What type of cost does this represent?
- Fixed
  - Direct
  - Variable
  - Indirect
15. Your organization has decided to train project managers on the use of the tool Microsoft Project, in the hopes that this will help them manage their projects more efficiently. Some of the more technically savvy people on the project management team have become very adept at many of the features contained in this tool - performing what-if analyses, earned value measurements, network diagrams, resource calendars and more. One of the stakeholders asked to see the project management plan for their project and the project manager opened up Microsoft Project to show him the plan. PMI® considers a tool like Microsoft Project to be *closest* to:
- The equivalent of a project management plan
  - A bar chart
  - A critical tool to help manage all project logistics
  - A necessary supplement to the project management plan
16. You have delivered a product to a client on time, on budget, and to specification, however the client is not happy with the result. What is the *next* thing that should happen?
- Schedule a meeting with the team to and propose a potential remedy for the client
  - Inform senior management of the client's unhappiness and discuss potential options to resolve the situation
  - Close out the contract - submit final billing to the client.
  - Quantify the client's issues and offer to address these issues in a subsequent release
17. In terms of integrated change control, the project manager's primary responsibility is to do all the following *except*:
- Ensure all changes are tracked and documented for the project
  - Ensure that only authorized changes are entered into the change management system
  - Ensure that all authorized changes are coordinated with Change Control Board (CCB)
  - Ensure that all requested changes are made to the project baselines

18. Which of the following is true regarding the project management plan?
- Integrates and consolidates the subsidiary plans
  - It is always highly detailed and focused
  - It cannot be changed unless senior management authorizes the change
  - B and C together
19. The project manager is assigned to a project \_\_\_\_\_?
- From the moment the project is conceived
  - Always before the start of planning
  - Prior to the creation of the charter
  - By the project stakeholders
20. A project at your organization is in trouble. Management has reassigned the project manager on the project and has given you the job of bringing it back in line. You have analyzed the prior project manager's project management plan, WBS, scope baseline and found that he actually did a good job. The problem was that there was an unusual amount of discovery on this particular project; it seems that management failed to address that the project had a high degree of risk and uncertainty - greater than 40% - risks that the prior project manager had raised on the project. When the PM raised those issues, management's position was "well, just do the best you can". This is a \$5 million project which is approximately at its halfway point, but the budget expended is close to \$3.5 million dollars at this point. The project is \$1 million over budget and 10% behind schedule. Management is alarmed at the budget burn rate and is thinking of canceling the project, even though what has been accomplished so far is high quality work that has exceeded customer expectation. What is the *best* advice you can give management at this point?
- With big budget overrun, talk with the team and then with the client about what scope elements can be removed and thus reducing overall costs
  - Do not include the sunk costs as part of your decision process
  - Discuss with management the most effective way to close the project down and see what part of the work effort can be salvaged
  - Swap out high cost resources with lower cost resources to bring the budget in line
21. Double declining balance is a form of?
- NPV calculation
  - Working capital calculation
  - Constrained optimization method
  - Accelerated depreciation
22. The project statement of work is fundamentally?
- Description of the product scope
  - A legal document
  - The same as the procurement statement of work
  - An output of Direct and Manage Project Work
23. The correct steps, in order, for implementing a change to a project are which of the following?
- Identify alternatives, document the change, identify need for change, perform impact assessment, submit to CCB for approval,
  - Perform impact assessment, identify alternatives, identify need for the change, document the change, submit to CCB for approval
  - Identify need for change, identify alternatives, perform impact assessment, submit to CCB for approval, document the change
  - Identify the need for change, perform impact assessment, identify alternatives, document the change, submit to CCB for approval

24. The difference between a configuration management system and a change control system is?
- The configuration management system is part of the PMI®S - the change control system is not
  - The change control system is part of the key PMI®S - the configuration management system is not
  - The change control system feeds into the configuration management system and is part of the configuration management system
  - Both the change control system and a configuration management system are organizational process assets
25. You are reviewing the risks on your project with key stakeholders. After the initial risk identification matrix was created, the discussion centered around the stakeholder's tolerance for risk on the project. Stakeholder risk tolerance levels are part of:
- Organizational process assets
  - Expert judgment
  - Enterprise environmental factors
  - Preventive action
26. Your company makes air conditioning equipment of all types. The company just issued a new discount line of window air conditioners. The account executives in the company are somewhat worried that the discount air conditioner market will undercut their higher priced models and will cut into their market and margins. You were assigned to manage the project that created the discount line of air conditioners and the project completed on time, on budget, and effectively passed all tests prior to the release announcement. One of the engineers in reviewing the final tests felt that one of the electronic components could be upgraded to a higher capacity without incurring additional cost to the manufacturing of the product. You reviewed the engineer's analysis and agreed that it would be a beneficial upgrade to the product. The upgrade of the part is *most explicitly* considered part of:
- The change management process
  - The process improvement plan
  - The quality assurance process
  - The configuration management process
27. The project is entering the closure phase. All the following are considered outputs of closure and updates to the organizational process assets with the *exception* of:
- Scope verification
  - Lessons learned
  - Project audit
  - Project management plan
28. Which of the following is *not* included in a project charter?
- Resource management plan
  - Risks and constraints
  - Business case
  - Budget limits
29. Your project team is well underway with the construction of the product of the project. Some of the work has progressed and some deliverables have been reviewed by key stakeholders. During a deliverables review, one of the stakeholders found a discrepancy in one of the deliverables that needed to be addressed immediately. The team reviewed the stakeholder's issue and agreed that some action needed to be taken to bring the deliverable back into compliance. The *best* definition for this activity is called:
- Defect repair
  - Corrective action
  - Quality control

- d. Preventive action
30. The project management plan is created by:
- a. The project sponsor with input from senior management
  - b. The project manager
  - c. The project manager with input from the project team
  - d. Senior management with input from the project manager
31. The key output of Direct and Manage Project Work Process is which one of the following:
- a. Creating the WBS
  - b. Deliverables
  - c. Enterprise environmental factors
  - d. Performance reports
32. You have been assigned as project manager for a project with a number of stakeholders. After the initiating process was completed, you are engaged in planning for the project and discover that the stakeholders are at odds with each other about what they want from the project. One stakeholder wants to make sure they don't lose headcount, while another stakeholder doesn't know if they have the capacity or the resources to deliver the product of the project. Two other stakeholders refuse to use offshore resources because they feel it will demoralize their teams and the remaining stakeholders have an issue with the timeline. As the project manager what is your *biggest* concern at this point?
- a. Getting the project management plan approved
  - b. Spending a lot of time on configuration management
  - c. Getting the authority from senior management to make project decisions that the stakeholders will have to follow
  - d. The best form of communications to implement for the project
33. A project charter can be all of the following except?
- a. Created with input from the project manager
  - b. Validates the project against organizational strategy
  - c. Includes a business case
  - d. A contract
34. All the following are reasons for a change request with the *exception* of:
- a. A missed requirement in the planning phase
  - b. A change to the high-level risks contained in the charter
  - c. A change in federal regulations
  - d. A change requested by stakeholder to address the competitive position of their product
35. You are evaluating software packages for your new ERP system. As the PM, you are going over decision criteria for the packages when you suddenly realize that you own 1000 shares of stock in one of the seller's companies competing for the contract. What should you do?
- a. Tell your senior manager and let her tell you what she would like you to do
  - b. Remove yourself from the decision process
  - c. Ensure you are being as impartial as possible and continue your evaluation
  - d. Call your broker and tell him to sell your shares of the stock

## Chapter 4 Test – Answers

1. D – One of the defined uses of a work authorization system is for the control of scope creep
2. D – They do not normally affect the project baselines. *PMBOK® Guide*, 5th edition p 97.
3. B – The PMI®S is an enterprise environmental factor
4. C – All the answers are correct – a PM does all these things. However the most critical aspect is the PM functioning as an integrator: putting all the parts and pieces of the project into an integrated whole
5. A – If the system tested out OK prior to the site installation, that is a sure signal that the internal system and the client system are configured differently
6. C – ‘Approved change requests’ are an input to Direct and manage Project Work. *PMBOK® Guide*, 5th edition p. 65
7. B – You always want to show the stakeholder the effects of their actions/inactions. C and D are wrong – the PM does not take unilateral action unless authorized to do so by the organization. Answers like A are usually wrong – this is the equivalent of “I’m telling the teacher what you did!”
8. B – Prior to baseline, the PM plan can be adjusted without a CR, consulting the change control board, or addressing a scope creep issue. *PMBOK® Guide*, 5th edition p. 78.
9. C – While the other answers may occur in the planning process, baselines require stakeholder sign-off
10. A – Work performance information is where this data is contained. Per the *PMBOK® Guide*, 5th edition, p 90
11. C – Senior management must be consulted regarding high-level constraints
12. C – Determining the project life cycle occurs in planning. Per the *PMBOK® Guide*, 5th edition, p 77.
13. A – Defect repair is considered rework
14. D – Shared facility expenses are indirect costs
15. B – It is closest to a bar chart
16. C – You're done. PMI® assumes that as the project manager, you have been obtaining customer sign-off for every intermediate deliverable on the project and that the customer has accepted those deliverables. If there were issues with the deliverables, you would have found this out long before the end of the project. The contract has been fulfilled according to scope, the budget, and the timeline. Closeout contract and submit your final bill
17. D – Implementing *all* requested changes can result in sub-optimizing the project. One of the PM's jobs is to protect the project from unnecessary changes.
18. A – It integrates and consolidates all the subsidiary management plans. *PMBOK® Guide*, 5th edition, p. 76
19. B – Always before the start of planning. *PMBOK® Guide*, 5th edition, p. 67
20. B – The sunk costs are never considered as part of your decision process. You have to decide where the project stands now, whether it is beneficial to complete what has been accomplished so far, and whether you can reach the goals of the project. This is a standard GAAP rule.
21. D – This is the only possible answer that is a form of accelerated depreciation
22. A – A project statement of work describes at a high level, the scope of the product of the project
23. D – This is the correct answer. *PMBOK® Guide*, 5th edition, pp 96
24. C – A and B are deliberate misdirection. D is incorrect. The change management system is subsumed within the configuration management system
25. C – Stakeholder risk tolerances are part of the enterprise environmental factors
26. D – While the upgrade represents a change that must be tracked, it ultimately impacts the configuration of the product
27. D – The project management plan is not part of project closure. *PMBOK® Guide*, 5th edition, pp 100-102
28. A - The resource management plan is a detail of planning and not of initiation, which is where the charter is created
29. A - Did you think it was a corrective action? Corrective actions are taken to bring the project into line at some future point. Defect repairs address immediate concerns
30. C – The project manager is always responsible for creating the project management plan with input from the subject matter experts on the project team
31. B – Deliverables. *PMBOK® Guide*, 5th edition, p. 65



- 32. A – Unless you can resolve stakeholder conflict, getting a project management plan approved will be your biggest concern. True, while you may have a more complicated job dealing with configuration management, it is not the immediate concern
- 33. D – A charter is not a contract. *PMBOK® Guide*, 5th edition, p.68
- 34. B – Change requests are necessary due to a change in scope, requirements, budget, or anything that impacts the product of the project. Assessment of risk is an ongoing *process* that occurs throughout the project
- 35. B – Even the appearance of a conflict of interest (CI) is best handled by removing yourself from the decision process. Answer A can get the organization into trouble at later date. Answer C does not deal with the conflict of interest. Answer D might still leave the appearance of a CI