OVERVIEW

The Eight Project Performance Domains

Chapter 1 named the eight performance domains; this deck opens each one. A domain is a group of related activities critical to delivering project outcomes, and all eight run at the same time and interact. Each section defines the domain, gives its key terms and practices, and ends with a "checking outcomes" table describing what success looks like: stakeholders (who is affected and how to engage them), team (management vs. leadership, culture, high performance), development approach and life cycle (predictive, hybrid, adaptive; cadence), planning (estimates, schedules, budget and reserves), project work (processes, constraints, procurement, knowledge), delivery (value, quality), measurement (metrics, KPIs, dashboards) and uncertainty (ambiguity, complexity, volatility, risk responses).

Concurrent, not sequential

The domains are interactive, interrelated and interdependent areas of focus that run throughout the project, however value is delivered.

Centralized vs. decentralized

Centralized: one accountable PM, more control and standardization, cheaper, less creative. Decentralized: authority near the work, faster and more creative, more expensive.

Approach spectrum

Predictive (stable, known requirements) ↔ hybrid ↔ adaptive (uncertain, volatile requirements; iterative and incremental).

Risk responses

Threats: avoid, escalate, transfer, mitigate, accept. Opportunities: exploit, escalate, share, enhance, accept.

HOW THE LECTURE IS ORGANIZED

Slides 1–5 What a performance domain is; 1 Stakeholders

Slides 6–18 2 Team: management and leadership, culture, high performance, emotional intelligence

Slides 19–34 3 Development approach and life cycle: cadence, predictive, hybrid, adaptive

Slides 35–52 4 Planning: estimates, schedules, dependencies, budget and reserves, procurement, metrics

Slides 53–65 5 Project work: processes, constraints, procurement and bids, knowledge

Slides 66–72 6 Delivery: value, quality, cost of quality

Slides 73–87 7 Measurement: metrics, KPIs, presenting information

Slides 88–107 8 Uncertainty: ambiguity, complexity, volatility, risk and reserves

EXAM FOCUS

Midterm 251 asked about the nature of performance domains, the purpose of cadence and when an iterative approach fits; its case study asked you to choose Agile, Waterfall or Hybrid. The instructor's 2026 midterm asked which opportunity strategy applies when a team acts to make sure an early finish happens (exploit). Finals drew on estimation, scheduling, risk responses, constraints, the scope statement and burn charts from this deck.

HOW TO READ THIS PAGE

Every original slide is shown unchanged. Yellow marks on a slide point to a numbered note: hover or tap a mark to jump to its note, and hover a note to see its marks. Questions tagged **Past exam** appeared on a real paper; **Prediction** questions are likely angles, not confirmed. Pick an answer to each question: a wrong pick tells you why it is wrong, so you can try again.

 Slide 1



Project Performance Domains

SE423: Software Project Management

1

NOTES

1. Chapter 1 listed the 8 domain names; this deck opens each one in turn. The number badge (1–8) on each domain's title slide keeps the order: stakeholders, team, development approach and life cycle, planning, project work, delivery, measurement, uncertainty.
2. For each domain learn its purpose, its key terms (many are examined as definitions), and one or two practices you could describe in a scenario answer.

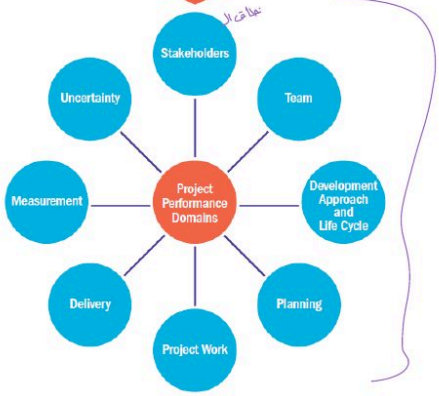
SLIDE 2 / 107 Project Performance Domains

Project Performance Domains

- A project performance domain is a group of related activities that are critical for the effective delivery of project outcomes.
- Project performance domains are interactive, interrelated, and interdependent areas of focus that work in unison to achieve desired project outcomes.
- Performance domains run concurrently throughout the project, regardless of how value is delivered (frequently, periodically, or at the end of the project).

Principles of Project Management			
Be a diligent, respectful, and caring steward	Create a collaborative team environment	Effectively engage with stakeholders	Focus on value
Recognize, evaluate, and respond to system interactions	Demonstrate leadership behaviors	Tailor based on context	Build quality into processes and deliverables
Navigate complexity	Optimize risk responses	Embrace adaptability and resiliency	Enable change to achieve the envisioned future state

Guide Behavior



2

NOTES

1. Think of a domain as one area a PM must keep an eye on, such as "are the stakeholders on board?". It is a **group of related activities** rather than a single task, and it is **critical** because neglecting it damages the outcome, whatever else goes well.

2. Interdependent means a problem in one area spreads. If nobody engages stakeholders, requirements come in wrong, so planning is built on bad information and delivery gets rejected. That's why the domains are **interactive, interrelated and interdependent** rather than separate checklists.

3. You never "finish" a domain and move on. On the last day of a project you are still managing stakeholders, measuring and handling uncertainty. So they **run concurrently** whether you ship weekly or once at the end. They are **not** phases done in order, which is exactly the trap in the real MCQ.

EXAM ANGLE

Past exam · Midterm 251 · V1 · MCQ 3 Q1

Which of the following best explains the nature of project performance domains?

A **They represent distinct areas of focus that guide effective project management.**

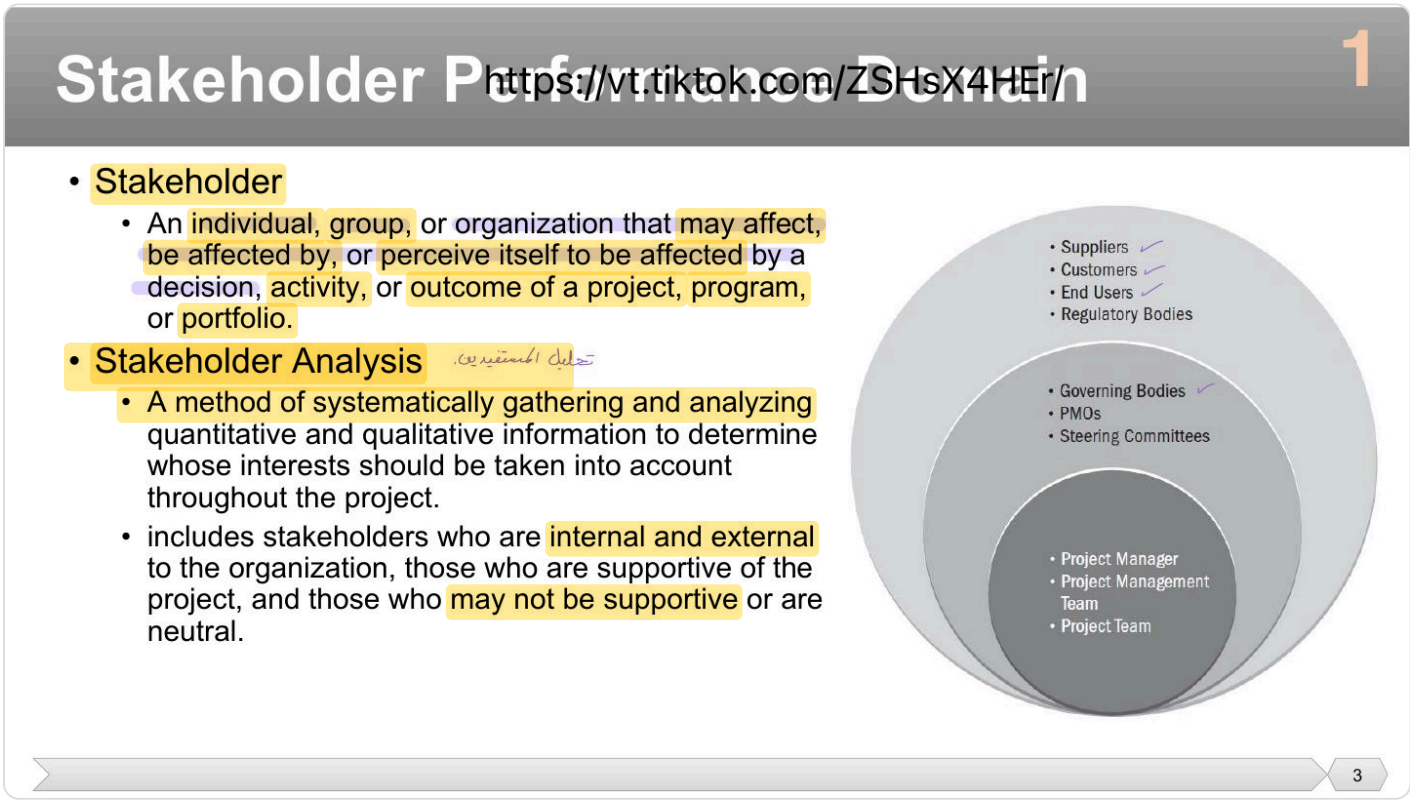
> Performance domains are areas of focus that run concurrently; they are not sequential processes or deliverables. (Also Midterm 251 V2 MCQ 1.)

B They are rigid processes that must be followed in order, from initiation to closure.

C They are optional tools that project managers may use only in large projects.

D They are specific deliverables required at the end of each project phase.

SLIDE 3 / 107 **Slide 3**



NOTES

1. The definition is deliberately broad. A neighbor annoyed by construction noise is a stakeholder, even with no role in the project. So is someone who only *believes* the project will take their job: **perceive itself to be affected** counts, because their reaction can still affect you.

2. You can't give everyone equal attention, so **stakeholder analysis** works out who matters and how. Numbers such as budget influence, plus judgment such as attitude toward the project, tell you **whose interests to take into account** first.

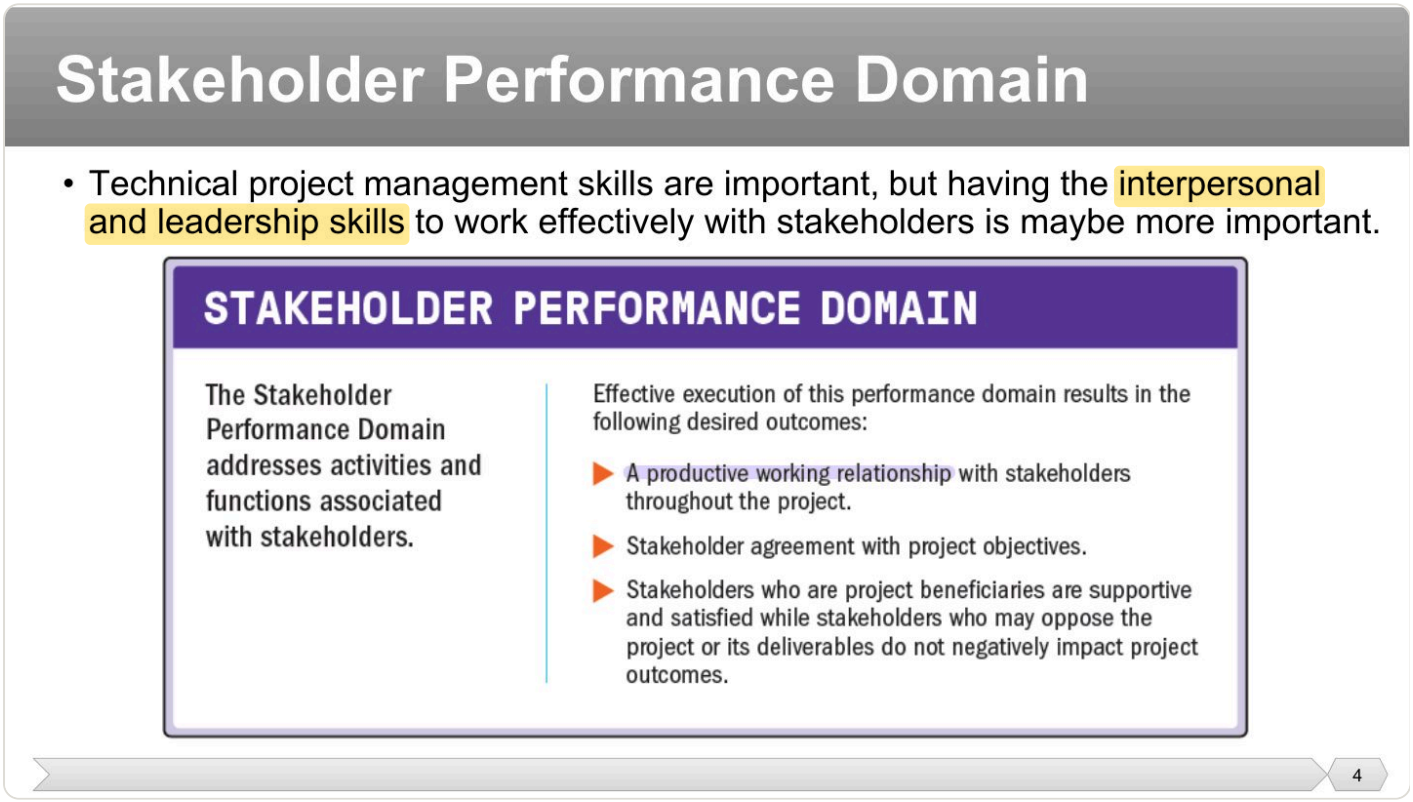
3 Teams tend to list only friendly people inside the company. Include people **internal and external**, and especially those who **oppose** the project: a regulator or an unhappy department can block you late, when change is most expensive.

EXAM ANGLE

Past exam · Midterm 251 · V1 · Case Q3 Q1

Edugate scheduling system: identify three main stakeholder groups for this project, describe their roles, and explain how their input will shape the system.
Answer: Students are the end users; their input shapes usability and flexibility (0.3). The IT/Edugate team ensures integration, security and compliance with PSU IT policies (0.3). Faculty advisors and administration ensure study-plan rules are enforced and use the system to monitor students (0.4).

SLIDE 4 / 107 Stakeholder Performance Domain



NOTES

1 Technical PM skills matter, but **interpersonal and leadership skills** for working with stakeholders may matter more. Most stakeholder problems (resistance, conflicting expectations) are solved by listening, negotiating and building trust, not by a better Gantt chart. The circles diagram groups stakeholders from the core team outward to customers, end users and regulators.

EXAM ANGLE

Prediction

Q1

A PM has a flawless schedule, but a key department keeps blocking the project. What does the slide suggest is most needed?

A Interpersonal and leadership skills

> The slide says these may matter even more than technical PM skills when working with stakeholders.

B A more detailed Gantt chart

> The plan isn't the problem. A better chart won't change how the department behaves.

C Replacing the development approach

> The way of building isn't what's blocking the project.

D A larger contingency reserve

> Money doesn't address a relationship problem.

SLIDE 5 / 107 **Checking Outcomes: Stakeholder Performance Domain**

Checking Outcomes of Stakeholder Performance Domain

Outcome	Check
A productive working relationship with stakeholders throughout the project	Productive working relationships with stakeholders can be observed. However, the movement of stakeholders along a continuum of engagement can indicate the relative level of satisfaction with the project.
Stakeholder agreement with project objectives	A significant number of changes or modifications to the project and product requirements in addition to the scope may indicate stakeholders are not engaged or aligned with the project objectives.
Stakeholders who are project beneficiaries are supportive and satisfied; stakeholders who may oppose the project or its deliverables do not negatively impact project results	Stakeholder behavior can indicate whether project beneficiaries are satisfied and supportive of the project or whether they oppose it. Surveys, interviews, and focus groups are also effective ways to determine if stakeholders are satisfied and supportive or if they oppose the project and its deliverables. A review of the project issue register and risk register can identify challenges associated with individual stakeholders.

NOTES

1. The “checking outcomes” table: the left column is what success looks like for the domain, the right column is the evidence that it happened. You won’t be asked to reproduce it, but it is a good structure for a written answer about the domain. Here: **a productive working relationship** with stakeholders throughout, checked by observing it and by how stakeholders move along the engagement continuum (unaware → resistant → neutral → supportive → leading).

EXAM ANGLE

Prediction

Q1

Many scope changes keep arriving from stakeholders. According to the checking-outcomes table, what might this indicate?

A The team is high performing

> That’s a different outcome, checked in a different domain.

B Stakeholders aren’t aligned with the project objectives

> A high number of changes is the evidence used to check agreement on objectives.

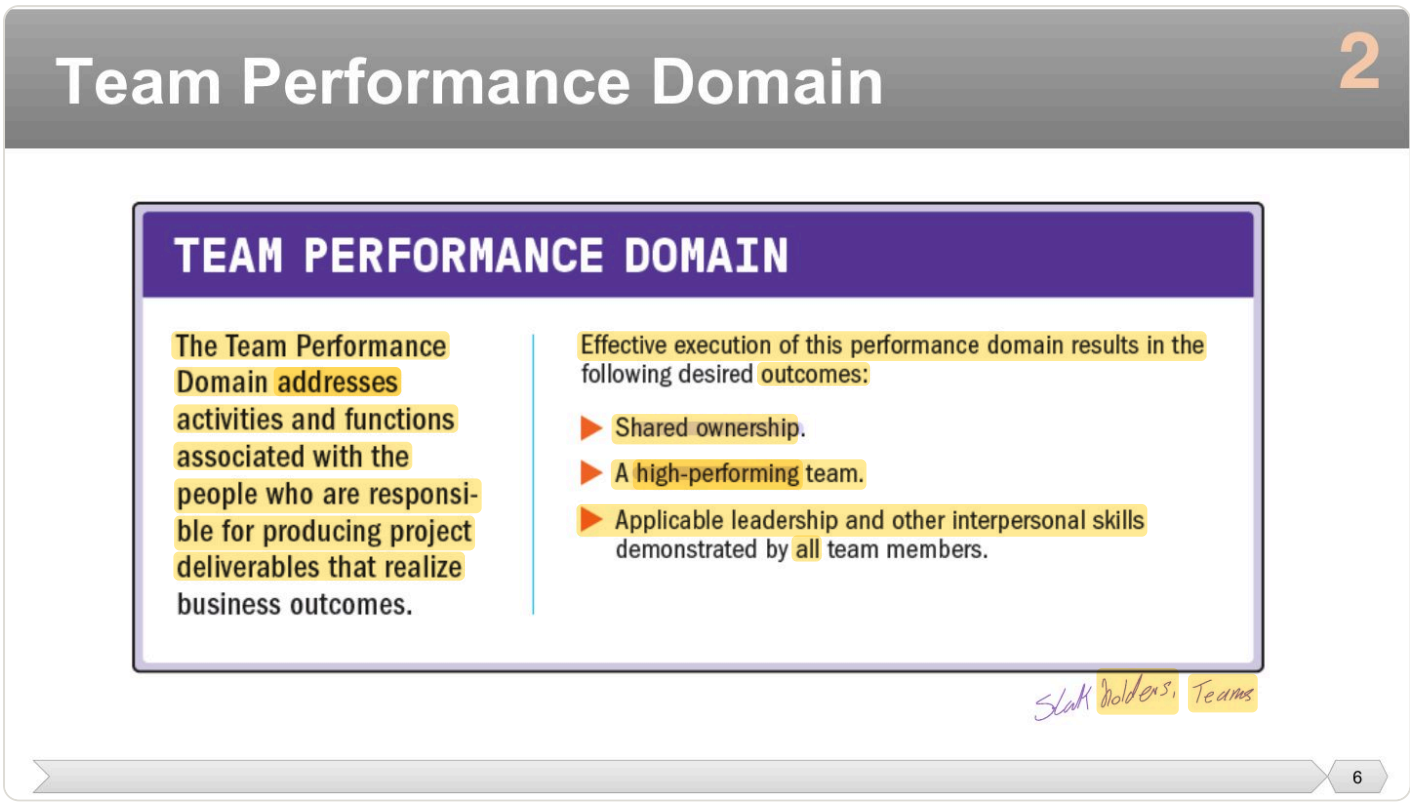
C The cost baseline is accurate

> Scope changes say nothing good about the baseline.

D The project has no opponents

> Changes don’t show whether opponents exist.

 Team Performance Domain



EXAM ANGLE

Prediction Q1

Which is a desired outcome of the Team performance domain?

A Fixed delivery dates for every release

That's a schedule constraint, not a team outcome.

B Leadership skills shown only by the PM

The domain deliberately says all members, not one person.

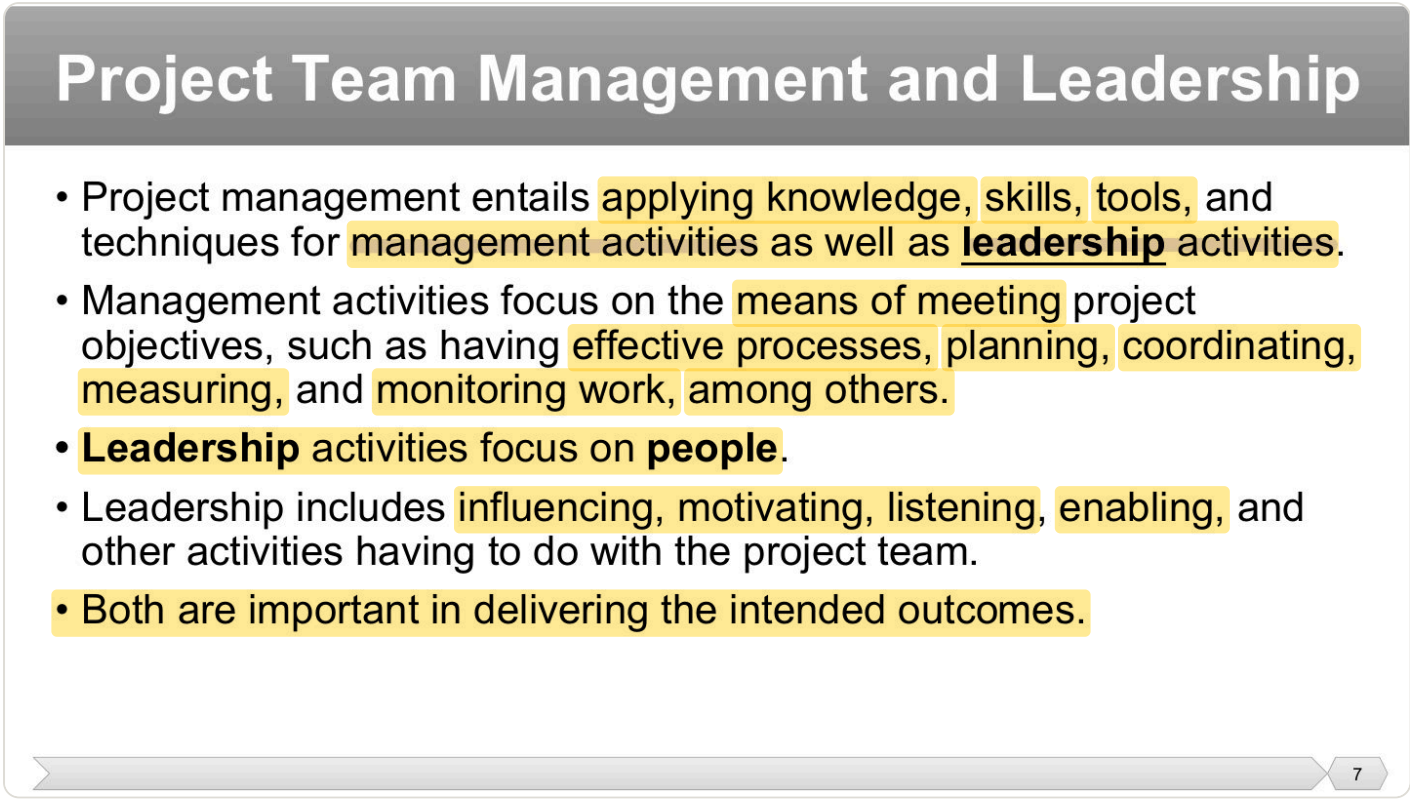
C **Leadership and interpersonal skills shown by all team members**

The outcome covers everyone, not just the PM.

D A team working without shared ownership

Shared ownership is one of the listed outcomes.

 Project Team Management and Leadership



NOTES

1. One person often does both jobs in the same meeting. Fixing the agenda and the timeline is **management**, while getting a discouraged tester back on board is **leadership**. A project needs both kinds of effort, so neither one replaces the other.
2. **Management** is about the machinery: are the plan, the tracking and the process working? A team can be happy and still miss the deadline if nobody manages the **means**.
3. **Leadership** is about whether people want to and can do the work. A perfect plan fails if the team doesn't trust it. A quick way to remember it: manage things, lead people.

EXAM ANGLE

Prediction Q1

Influencing, motivating and listening to the team are examples of which kind of activity?

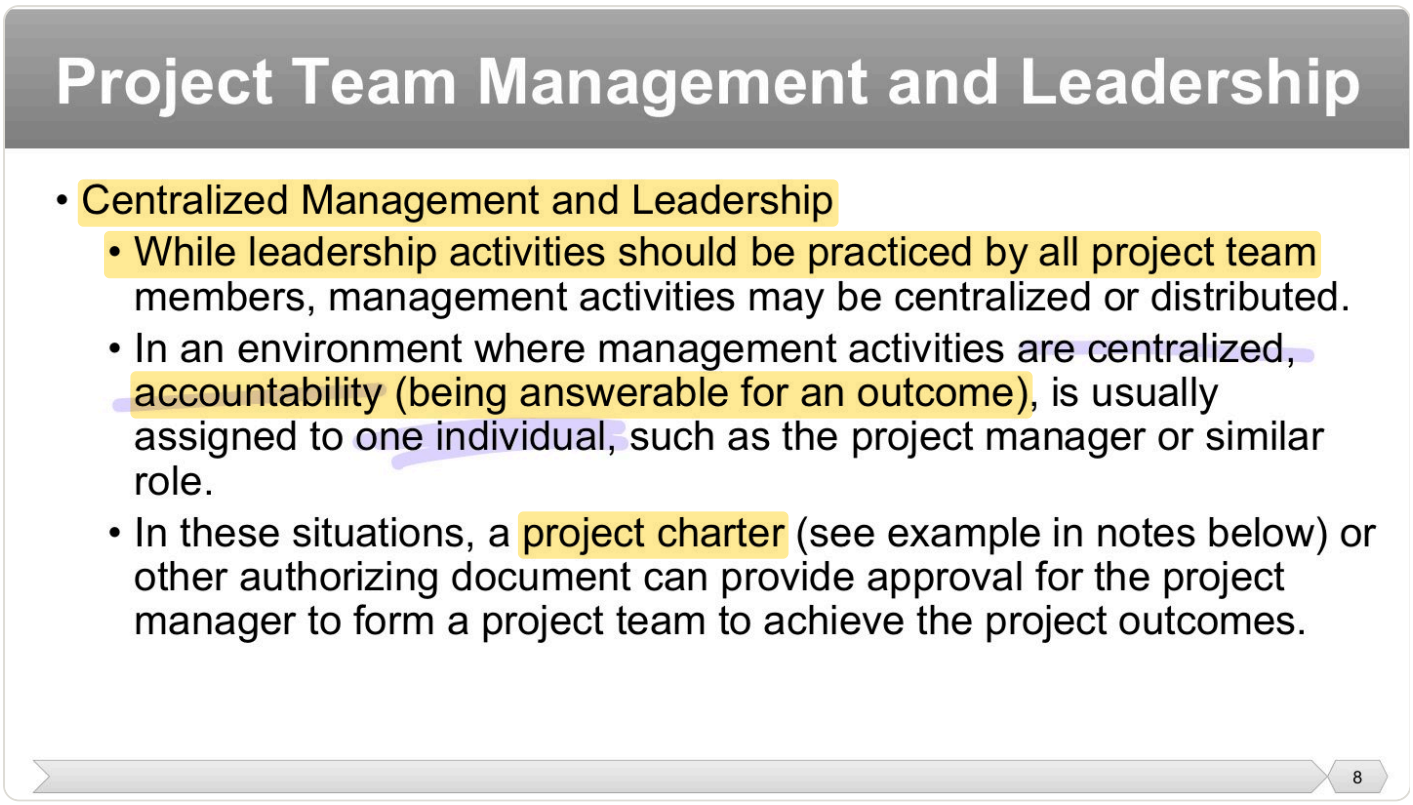
A Management activities

B Governance activities

C Procurement activities

D **Leadership activities**

 Project Team Management and Leadership



NOTES

1. Anyone can show leadership, for example by helping a stuck teammate or raising a concern, without any title. **Management** is different, because someone has to be assigned tasks like budgets and reporting, and an organization can give them to one person or share them out.

2. **Accountability** means that when something goes wrong, there is a known person who has to answer for it. Centralizing it makes things clear: everyone knows who decides and who to escalate to.

3. Being named PM isn't enough, since you need the right to spend money and pull people from other departments. The **project charter** is the document that formally gives that right, so nobody can later ask who authorized it.

EXAM ANGLE

Prediction Q1

On a project with centralized management, who usually carries accountability?

A Whoever facilitates that week

> A rotating facilitator belongs to distributed management.

B The customer

> The customer isn't accountable for managing the project.

C Every team member equally

> That describes shared work, not centralized accountability.

D One individual, such as the project manager

> Centralized means being answerable sits with one assigned person.

Prediction Q2

What gives a PM approval to form the team and use resources?

A The stakeholder analysis

> That analysis tells you whose interests matter, not who is authorized.

B A project charter or other authorizing document

> This is the document that formally authorizes the PM.

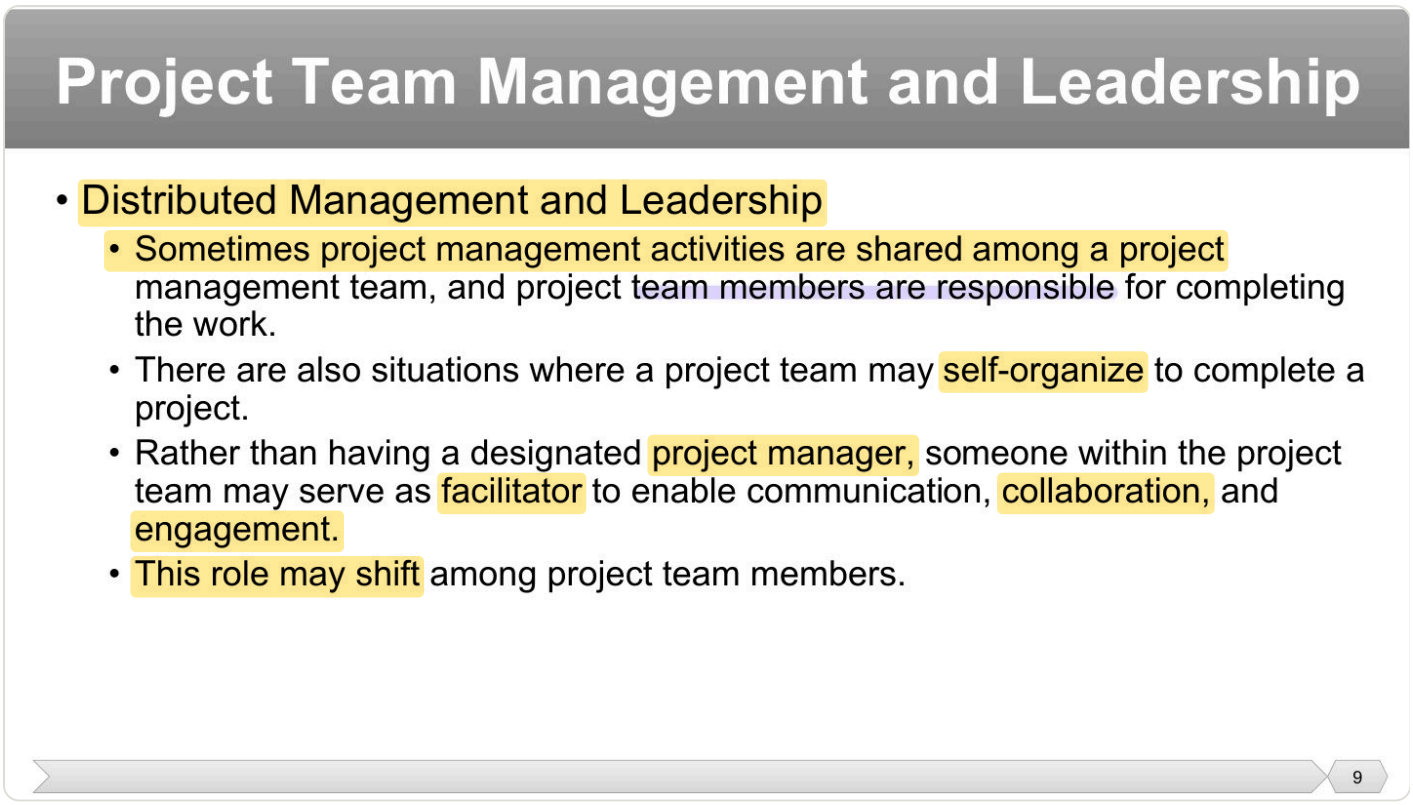
C A burndown chart

> A burndown chart shows work remaining.

D The risk register

> A risk register records risks. It authorizes nothing.

 Project Team Management and Leadership



NOTES

1. Here the PM's tasks are split up, such as one person tracking budget and another handling risks, while the rest of the team builds. It suits teams that are experienced enough not to need one central decision-maker.

2. To **self-organize** means nobody assigns the work: the team decides among themselves who does what and how. It depends on a mature team, because it collapses if nobody takes responsibility.

3. A **facilitator** doesn't give orders. They run the conversation and remove obstacles, as a Scrum master does. **The role can shift** because it isn't a rank, so whoever suits the current stage can take it on.

EXAM ANGLE

Prediction Q1

A team has no designated PM. One member runs discussions this month, and another may next month. What is this person?

A The project sponsor

> A sponsor funds and supports a project from outside the team.

B A contracting officer

> That role handles procurement contracts.

C The accountable project manager

> The scenario says there is no designated PM.

D A facilitator

> A facilitator enables communication, collaboration and engagement, and the role can shift.

Prediction Q2

In distributed management, leadership is limited to the person who is the facilitator.

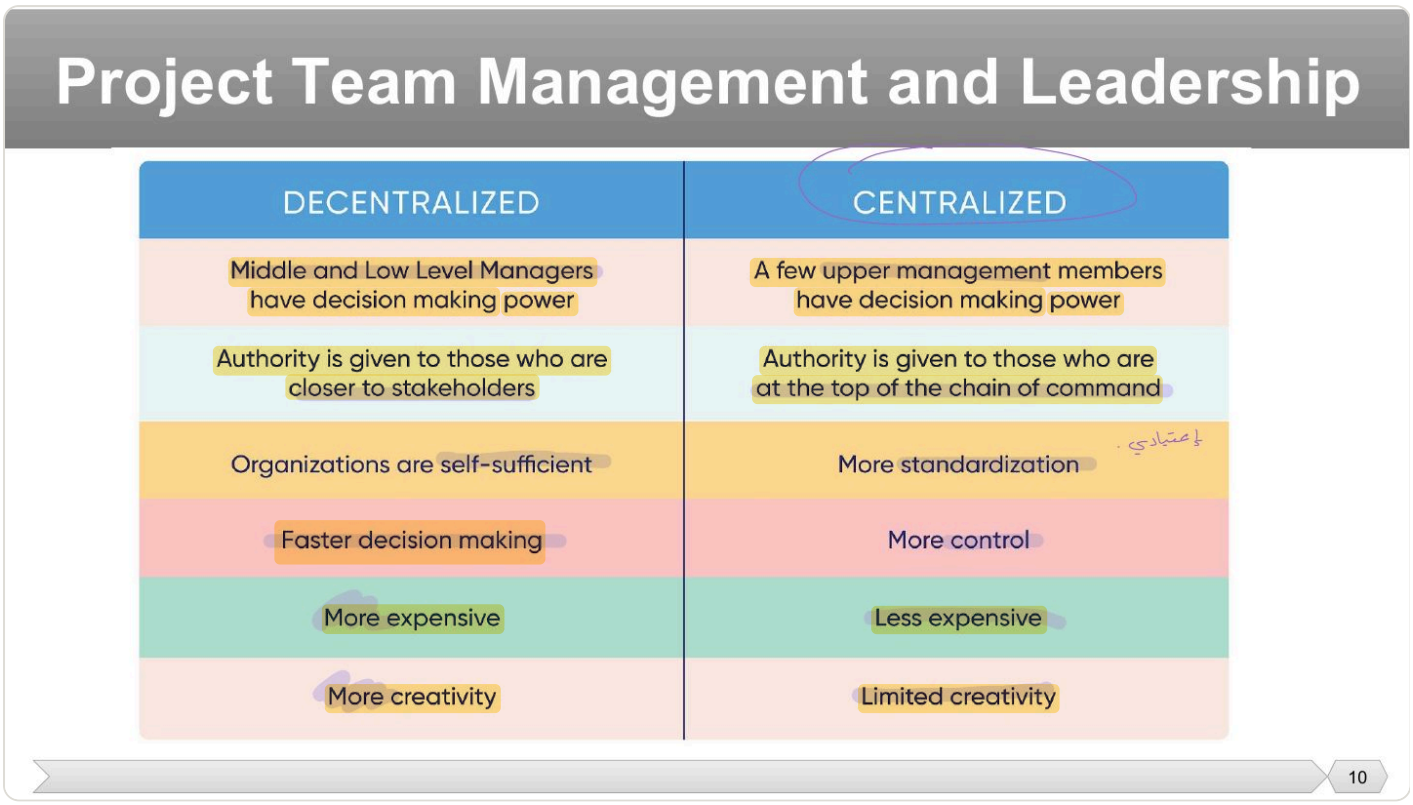
T True

> Distributed management shares activities, and leadership belongs to everyone.

F False

> Leadership should be practiced by all team members.

 Centralized vs. Decentralized



NOTES

1. **Decentralized**: middle and lower-level managers have decision power, and authority goes to those **closer to the stakeholders**; units are self-sufficient.
2. Decentralized gives **faster decisions and more creativity** but is **more expensive** (duplicated resources and skills in each unit).
3. Centralized gives **more standardization and control** and is **less expensive**, with limited creativity. Learn it as three opposite pairs: speed vs. control, more vs. less expensive, creativity vs. standardization.

EXAM ANGLE

Past exam · Midterm 251 · V1 · MCQ 1 Q1

In decentralized project management, decision-making authority is primarily:

A Distributed among team members to encourage shared accountability.

(Also Midterm 251 V2 MCQ 2.)

B Concentrated in the hands of a single project manager.

C Transferred to external auditors for oversight.

D Reserved exclusively for senior executives in the organization.

Prediction Q2

Which is a characteristic of decentralized management, according to the table?

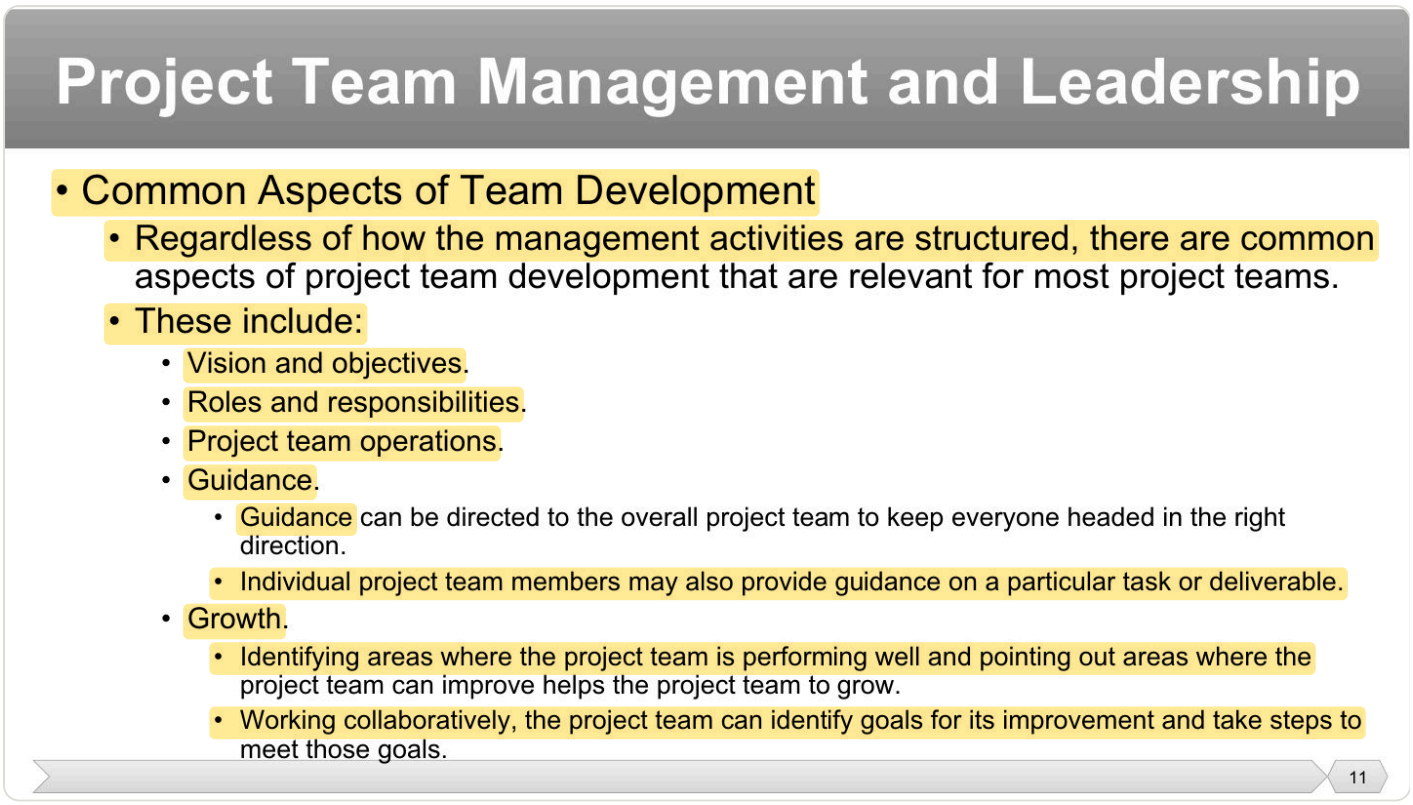
A Less expensive with limited creativity

B Authority at the top of the chain of command

C More standardization and control

D Faster decision making but more expensive

 Project Team Management and Leadership



NOTES

1. These come first because missing them causes problems no process can fix. If people disagree on the goal or on who owns what, you get duplicate work and gaps. Agreeing on **team operations** (how meetings, decisions and communication work) avoids daily friction.
2. **Guidance** isn't only top-down. The PM keeps the whole team heading the same way, while the most experienced person on a task may guide others on it, such as the database expert advising on queries.
3. **Growth** needs honesty in both directions. Naming what works keeps it going, and naming what doesn't gives the team something specific to improve. That's what a retrospective does.

TIPS & TRICKS

- Sentence, in slide order: **V**ery **R**ich **P**eople **G**et **G**old. Vision and objectives, Roles and responsibilities, Project team operations, Guidance, Growth.

EXAM ANGLE

Prediction Q1

During a retrospective, the team notes what went well and sets goals to improve. Which aspect of team development is this?

A Growth

Growth means identifying strengths and areas to improve.

B Vision and objectives

That's the shared goal, not reviewing how the team performs.

C Roles and responsibilities

That's about who owns what.

D Guidance

Guidance keeps people headed the right way, rather than reviewing performance.

Prediction Q2

Which is NOT one of the common aspects of team development?

A Vision and objectives

This is on the slide's list.

B Project team operations

This is on the slide's list.

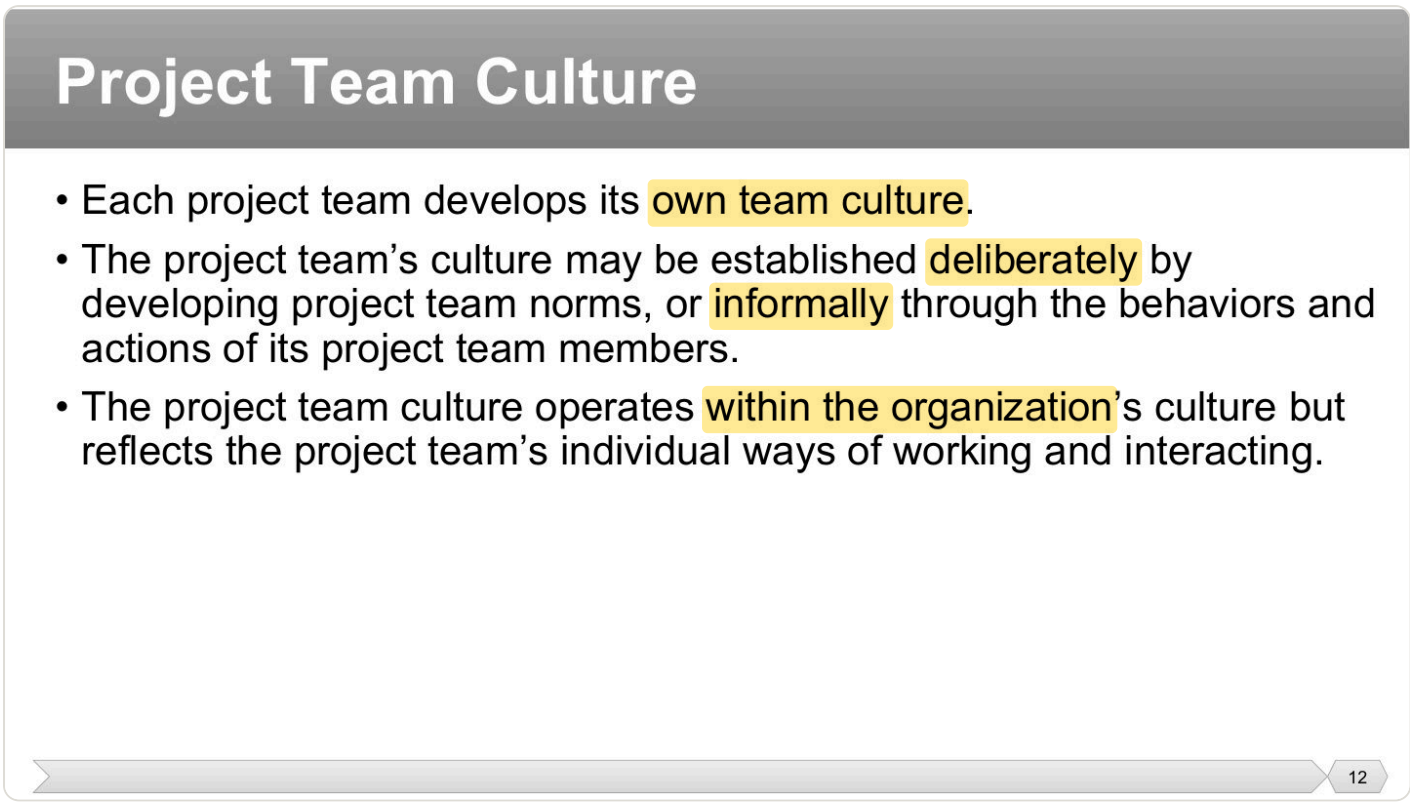
C Guidance

This is on the slide's list.

D Procurement

Procurement belongs to the project work domain.

 Project Team Culture



NOTES

1. Put two teams in one company and they can still feel completely different, in how they argue, how fast they reply and whether they admit mistakes. A team's **own culture** always forms, so the only question is whether anyone shapes it.

2. A culture built **deliberately** starts with agreed rules: "we review every pull request within a day." If nobody agrees anything, culture forms **informally** from behavior, for example if the PM ignores late work, the team learns lateness is fine.

3. A team can't ignore its company's rules, so a bank's project team still follows the bank's compliance culture. Inside those limits, it can still set its own habits. Think of a family living under a country's laws.

EXAM ANGLE

Prediction Q1

A team agrees that every pull request gets reviewed within a day. How has this part of its culture been established?

A Deliberately, by developing team norms

An agreed rule is a deliberate norm.

B Informally, through behavior alone

Informal culture just forms from behavior, without an agreement.

C By replacing the organization's culture

A team culture operates within the organization's culture.

D Through the project charter

A charter authorizes a project. It doesn't set review habits.

Prediction Q2

A project team's culture operates independently of the organization's culture.

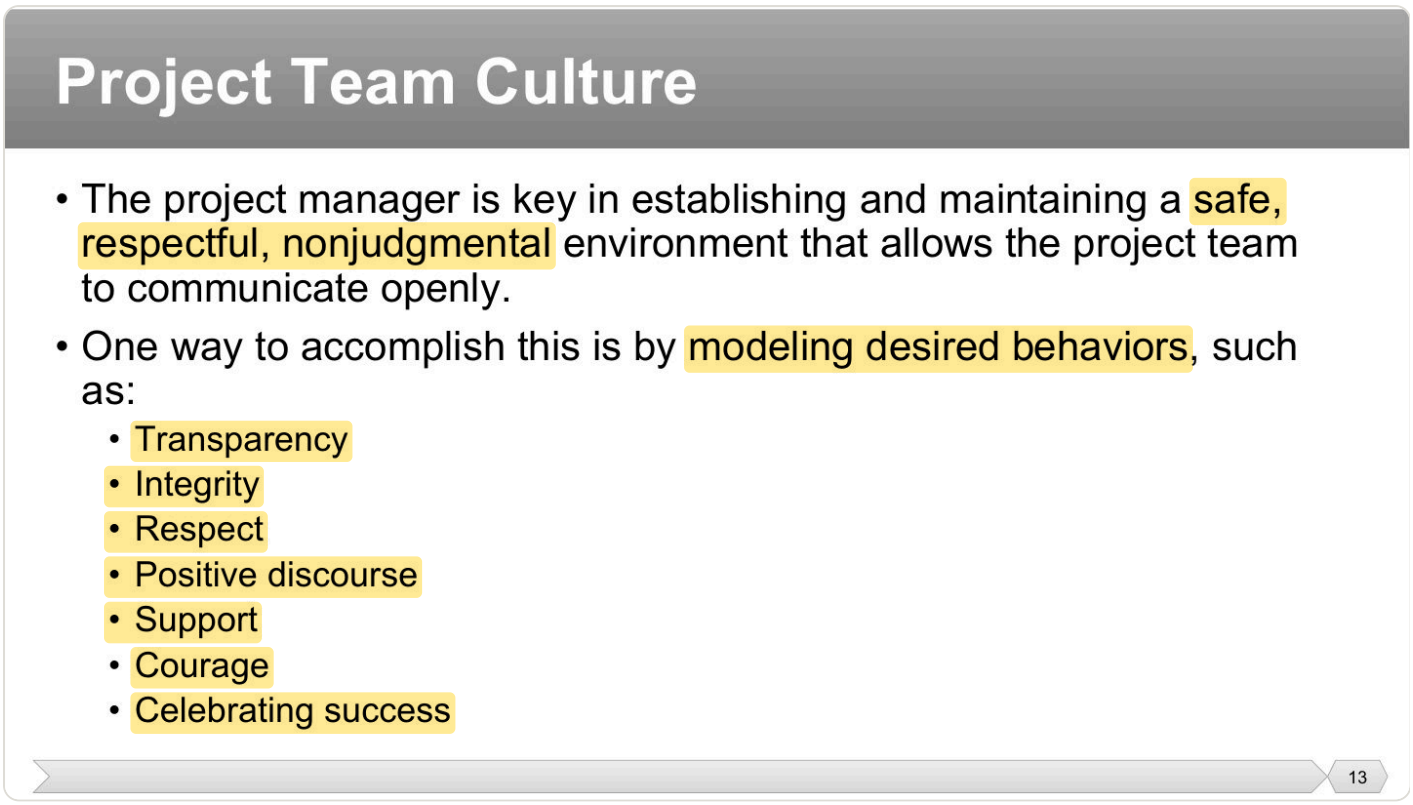
T True

The team can't ignore the wider culture, which sets its limits.

F False

It operates within the organization's culture, while reflecting the team's own ways of working.

 Project Team Culture



NOTES

1. People hide bad news if speaking up gets them punished, and hidden problems are the expensive ones. A **safe, respectful, nonjudgmental** environment makes it normal to say "I'm stuck" early, and the PM is the one who sets that tone.
2. Teams copy what you do, not what you say. A PM who admits a mistake in a meeting teaches more than any poster about honesty. **Courage** matters most here, since it's what gets problems raised before they grow.
3. Recognition tells people that their effort was noticed, which is a big part of why they keep giving it. **Celebrating success** can be small, like thanking someone in a review, and works best when it's specific.

TIPS & TRICKS

- **CRyPTICS**: Courage, Respect, Positive discourse, Transparency, Integrity, Celebrating success, Support.

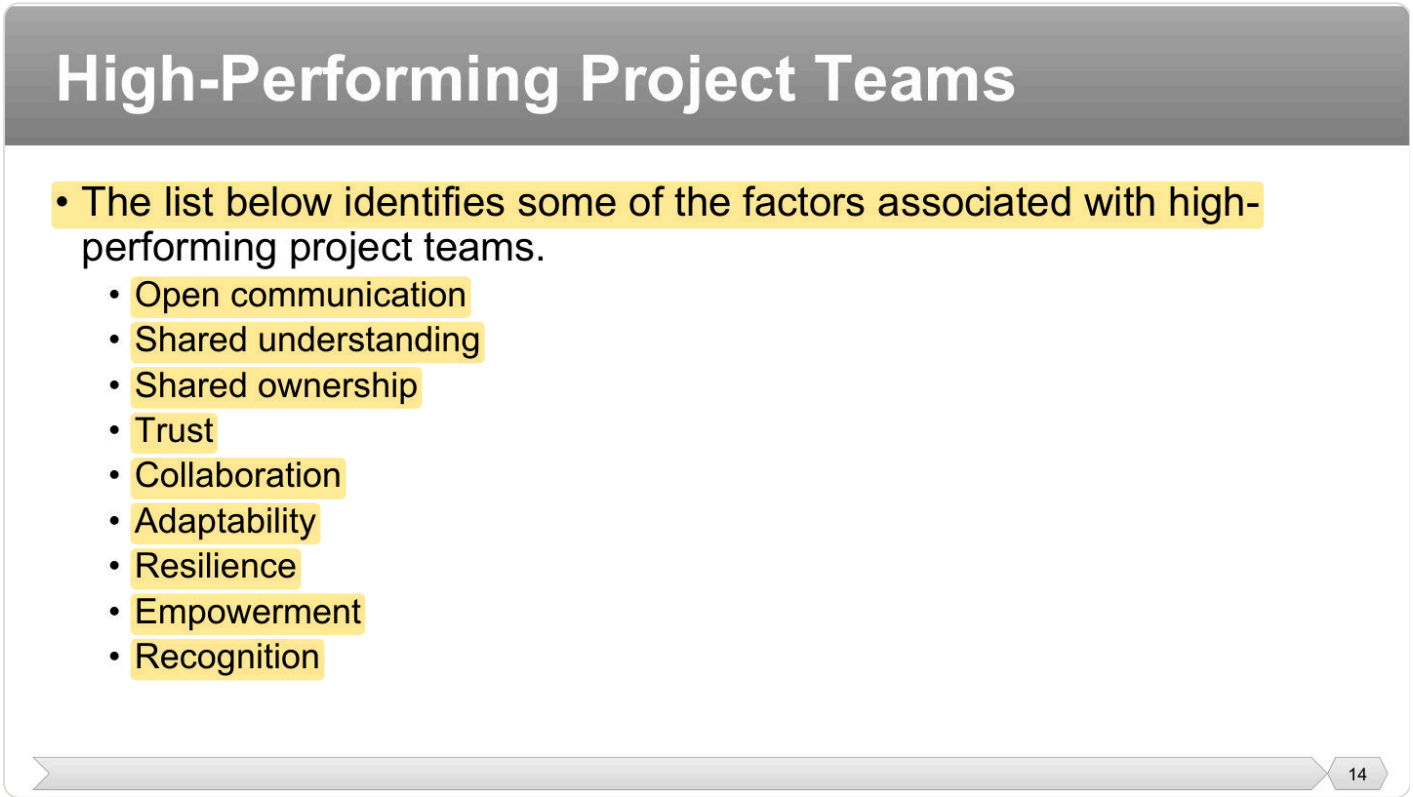
EXAM ANGLE

Past exam · Final 251 · Q5.3 Q1

Your team has just completed a major milestone in the project development process. How would you celebrate this achievement collaboratively with your team members? How would you recognize individual contributions to the team's success? What actions would you take to ensure that team morale remains high as you move forward in the project?

Answer: Celebrate as a team, e.g. a team lunch and an announcement of the milestone to the stakeholders. Recognize individuals specifically and publicly: name what each person contributed in the meeting, send thank-you notes to their managers, and give certificates or small rewards. Keep morale high with a retrospective that captures what went well, clear and achievable next goals, a balanced workload to avoid burnout, growth opportunities, and continued recognition, not only at milestones.

SLIDE 14 / 107 **High-Performing Project Teams**



NOTES

1. A team can't work together toward something it pictures differently. **Open communication** surfaces problems, **shared understanding** means everyone pictures the same goal, and **shared ownership** means nobody says "that's not my part" when something breaks.
2. **Trust** lets people ask for help without fear, and **collaboration** is what trust makes possible. Without them, people protect their own piece of the work and the pieces don't fit together.
3. Projects never go as planned. **Adaptability** is changing course when a requirement changes, and **resilience** is recovering after a real setback, such as a failed release.
4. **Empowerment** means people can decide without waiting for approval, which speeds everything up. **Recognition** makes them want to keep doing it. Empowerment without recognition burns people out.

TIPS & TRICKS

- **R**oller **COASTERS**: Recognition, then Collaboration, Open communication, Adaptability, Shared understanding, Trust, Empowerment, Resilience, Shared ownership.

EXAM ANGLE

Past exam · Midterm 251 · V1 · Short Q1 — Q1

What are key characteristics of a good team?
Answer: A good team trusts each other enough to speak openly and admit mistakes, shares a clear goal with clear roles, debates ideas in healthy conflict, commits to decisions, holds each other accountable, and puts team results ahead of individual credit. (The slide's factors: open communication, shared understanding and ownership, trust, collaboration, adaptability, resilience, empowerment, recognition.)

SLIDE 15 / 107 **Leadership Skills**



NOTES

1. **Vision**: establish and maintain a shared picture of what the project is for, so decisions point the same way.
2. **Critical thinking**: weigh evidence, question assumptions and make sound judgments.
3. **Motivation**: understand what drives each person (intrinsic or extrinsic) and use it.
4. **Interpersonal skills**: emotional intelligence, decision-making and conflict resolution (next slide).

TIPS & TRICKS

- **MICE**: Motivation, Interpersonal skills, Critical thinking, Establishing and maintaining vision.

EXAM ANGLE

Prediction Q1

A PM weighs the evidence and questions assumptions before a decision. Which leadership skill is this?

A Motivation

> Motivation is about what drives people to act.

B Establishing vision

> Vision is the shared picture of what the project is for.

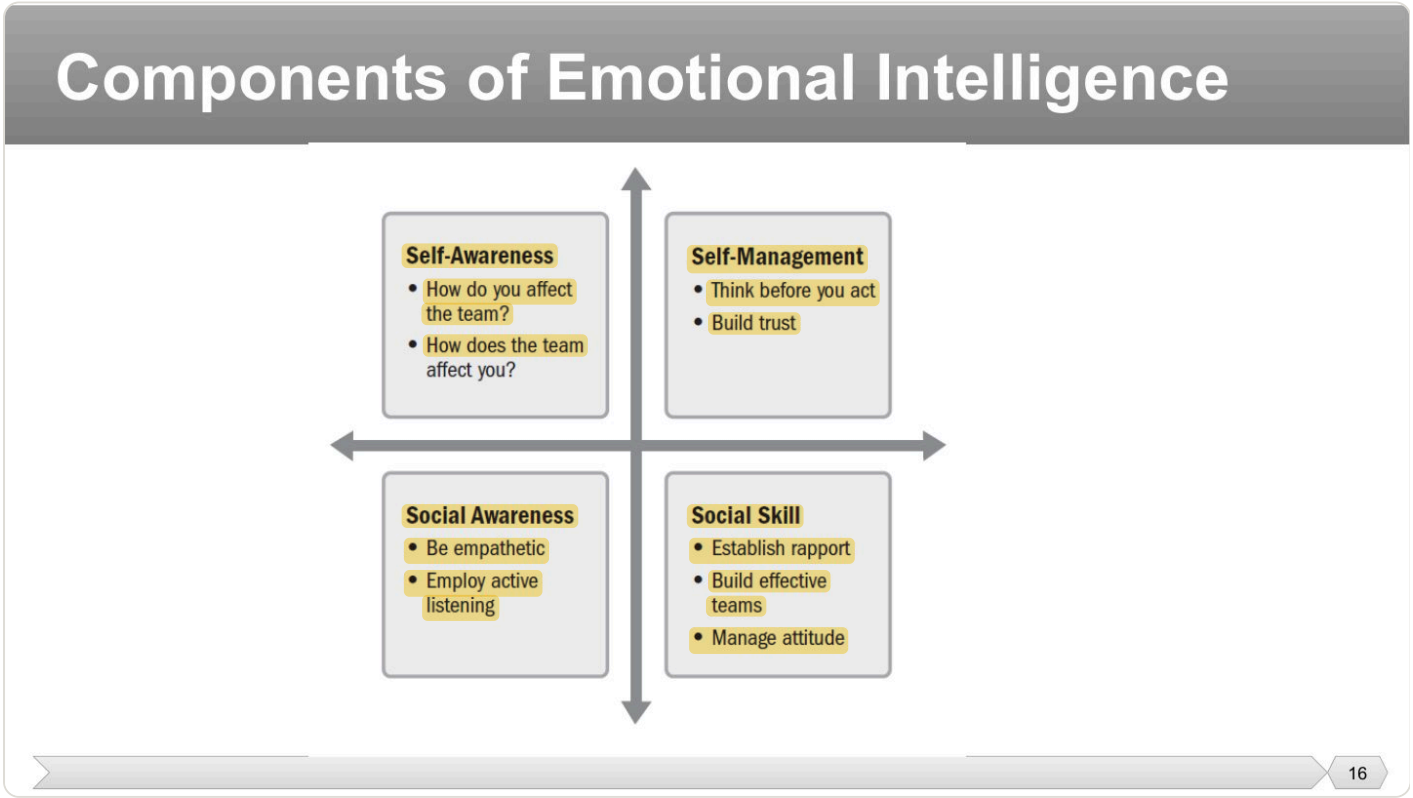
C Critical thinking

> Weighing evidence and questioning assumptions is critical thinking.

D Interpersonal skills

> Those concern how you deal with other people.

SLIDE 16 / 107 **Components of Emotional Intelligence**



NOTES

1 Emotional intelligence (EI) has four components: two about yourself, two about others. **Self-awareness**: how do you affect the team, and how does the team affect you?

EXAM ANGLE

Prediction Q1

"Be empathetic" and "employ active listening" belong to which component of emotional intelligence?

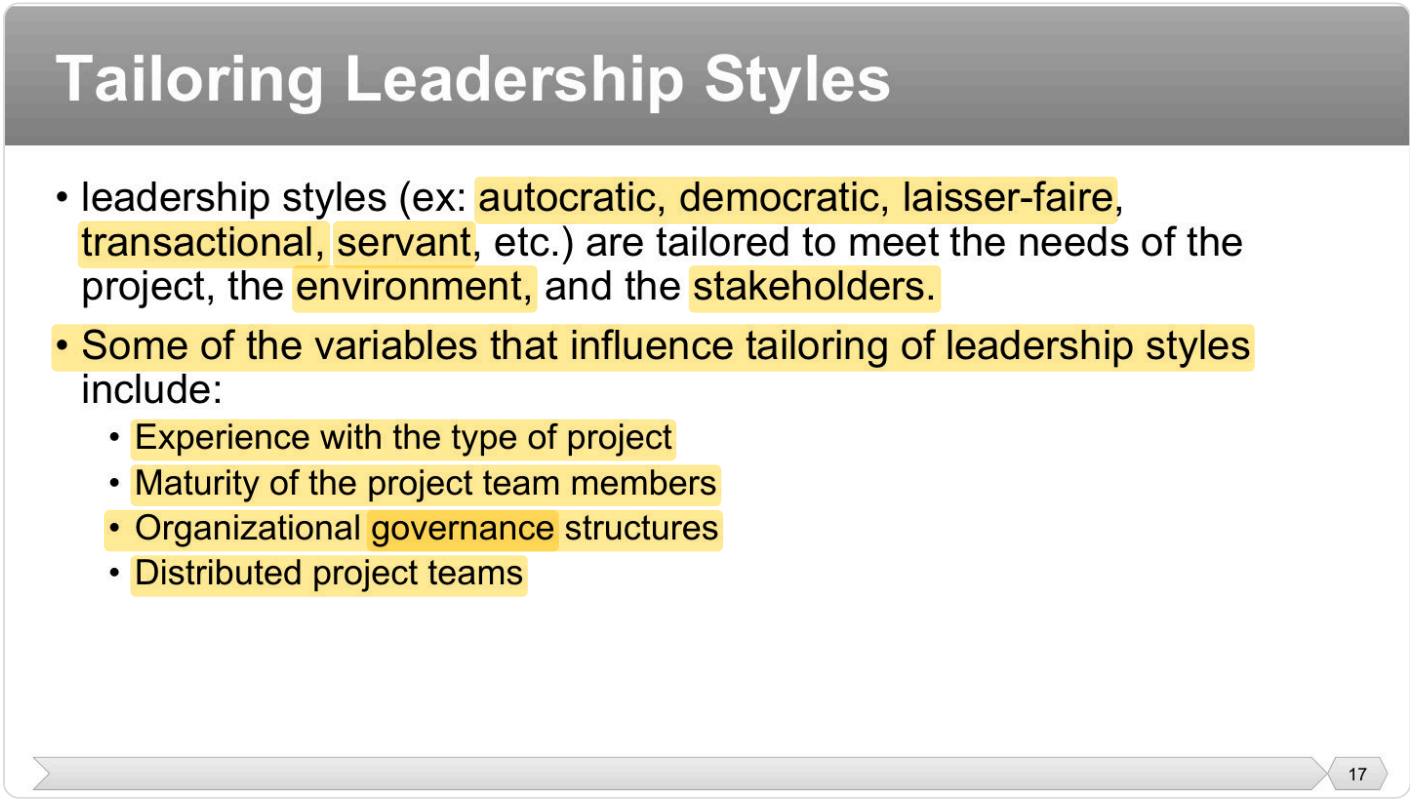
A Self-awareness

B **Social awareness**

C Self-management

D Social skill

SLIDE 17 / 107 **Tailoring Leadership Styles**



NOTES

1 No style is always right, so the PM picks one that suits the situation. **Autocratic** can work in a crisis when a fast decision is needed, while **servant** leadership suits a skilled team that only needs obstacles removed. Using one fixed style is the mistake.

2 Each variable changes how much direction people need. A team new to this type of project needs more guidance. A mature team would resent it. Strict **governance** limits what you can leave to the team, and a **distributed** team needs more deliberate communication because nobody overhears anything.

TIPS & TRICKS

- **DEMO**: Distributed teams, Experience with the project type, Maturity of team members, Organizational governance.

EXAM ANGLE

Past exam · Midterm 251 · V1 · Short Q5 Q1

How can a project manager balance technical leadership with adaptive leadership in a software team? **Answer:** First diagnose the problem. When it can be solved by known means (a coding standard, an architecture choice the PM knows well), use technical leadership: give direction from expertise and vision. When it can't (new technology, unclear requirements), use adaptive leadership: frame the purpose, ask questions, let the team experiment and learn, and motivate through visible progress. Switching between the two as the situation changes is the balance. (Also Midterm 251 V2 Short Q5.)

SLIDE 18 / 107 **Checking Outcomes: Team Performance Domain**

Checking Outcomes—Team Performance Domain

Outcome	Check
Shared ownership	All project team members know the vision and objectives. The project team owns the deliverables and outcomes of the project.
A high-performing team	The project team trusts each other and collaborates. The project team adapts to changing situations and is resilient in the face of challenges. The project team feels empowered and empowers and recognizes members of the project team.
Applicable leadership and other interpersonal skills are demonstrated by all project team members	Project team members apply critical thinking and interpersonal skills. Project team member leadership styles are appropriate to the project context and environment.

NOTES

1. The “checking outcomes” table: the left column is what success looks like for the domain, the right column is the evidence that it happened. You won’t be asked to reproduce it, but it is a good structure for a written answer about the domain. Team: **shared ownership** (members are engaged and take initiative), a **high-performing team** (trust, collaboration, adapting to change) and **leadership shown by all** (evidenced by members’ interpersonal skills and initiative).

EXAM ANGLE

Prediction

Q1

Which evidence best shows “shared ownership” on a team?

A The PM makes every decision

> That shows the opposite of ownership.

B **Members are engaged and take initiative**

> That’s how the table checks shared ownership.

C Tasks only get done when assigned

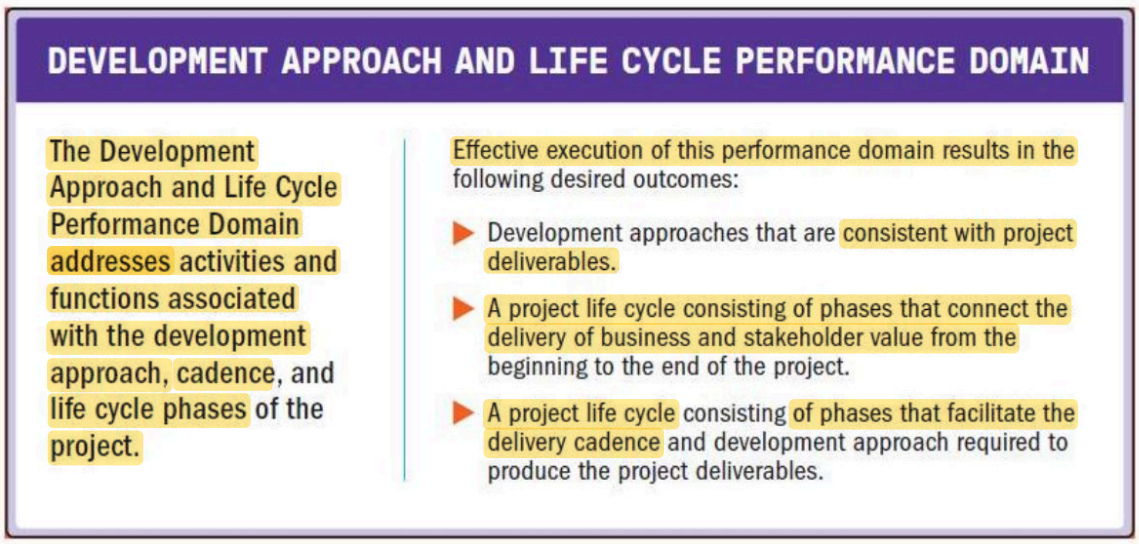
> That shows people are waiting, not owning the work.

D The budget is on target

> That’s about cost, not the team.

 Development Approach and Life Cycle Performance Domain

Development Approach and Life Cycle Performance Domain 3



19

NOTES

1. This domain answers three questions: how do we build it (**development approach**), how often do we deliver (**cadence**), and what stages do we go through (**life-cycle phases**)? The answers have to fit together.

2. The approach has to match what you're building: you can't construct a bridge in two-week releases. The phases then need to fit the rhythm you promised, so that value reaches people when expected. That's what **consistent with the deliverables** means.

EXAM ANGLE

Prediction Q1

Which three things does this domain cover?

A Budget, schedule and metrics

> These belong to planning and measurement.

B Bid documents, contracts and vendors

> These belong to project work.

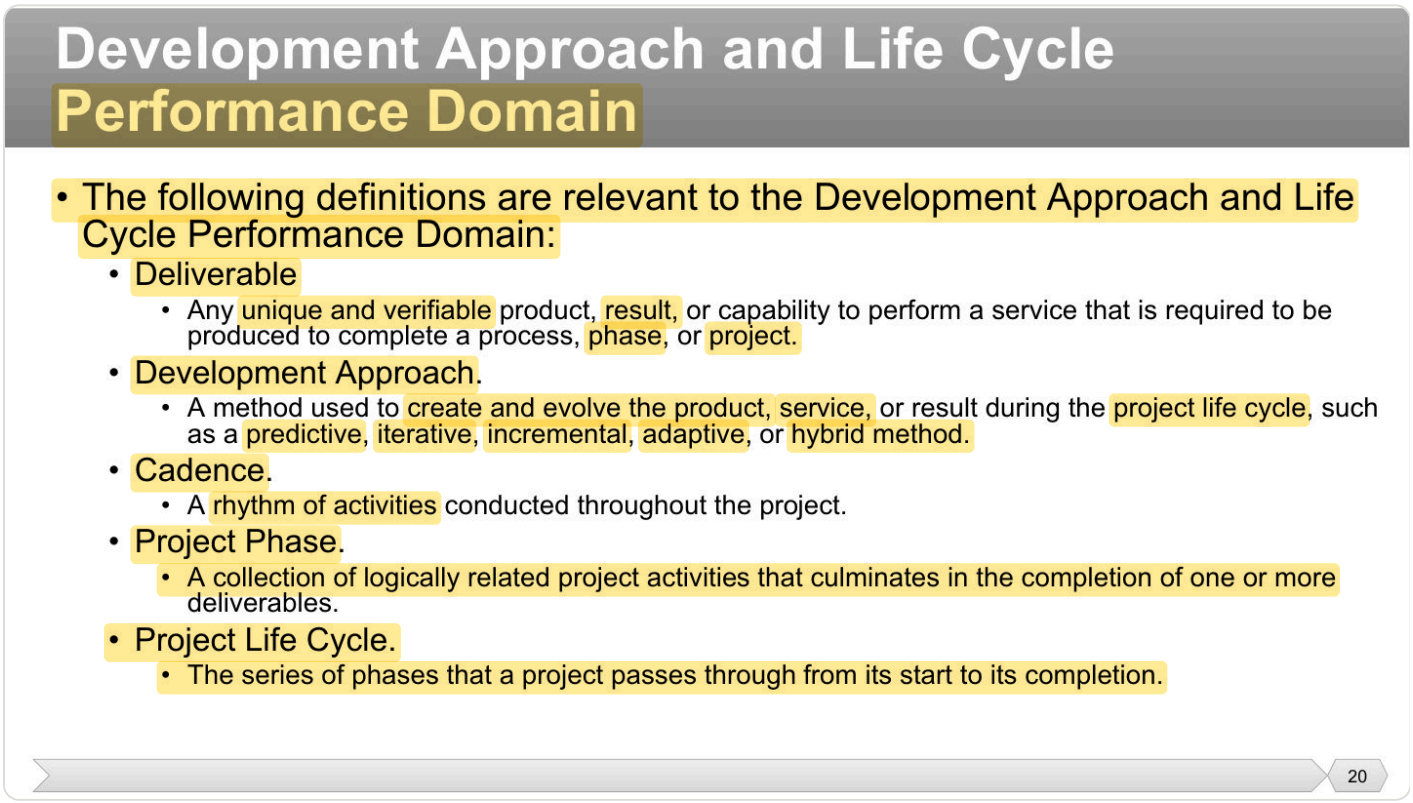
C Threats, opportunities and reserves

> These belong to the uncertainty domain.

D Development approach, cadence and life-cycle phases

> These are the domain's three topics.

SLIDE 20 / 107 **Development Approach and Life Cycle**



NOTES

1 The test is in two words: **unique** (specific to this work) and **verifiable** (someone can check it exists and is correct). "A signed test report" is a deliverable. "Better teamwork" isn't, since you can't verify it.

2. This is the “how do we build it?” choice. **Predictive** plans everything first, while **adaptive** learns as it goes. **Iterative** and **incremental** are ways of working within those. Chapter 4 compares them in detail.

3. **Cadence** is a rhythm, like a heartbeat. When everyone knows a demo happens every second Thursday, they plan around it without needing extra coordination.

4. A **phase** is a chunk of work that ends with something to show, such as “design” ending in approved designs. The **life cycle** is all the phases in order, so a phase is a chapter and the life cycle is the book.

EXAM ANGLE

Past exam · Midterm 251 · V1 · MCQ 4 Q1

In project management, what is the primary purpose of establishing a project cadence?

A **To create a predictable rhythm that supports coordination, communication, and timely delivery.**

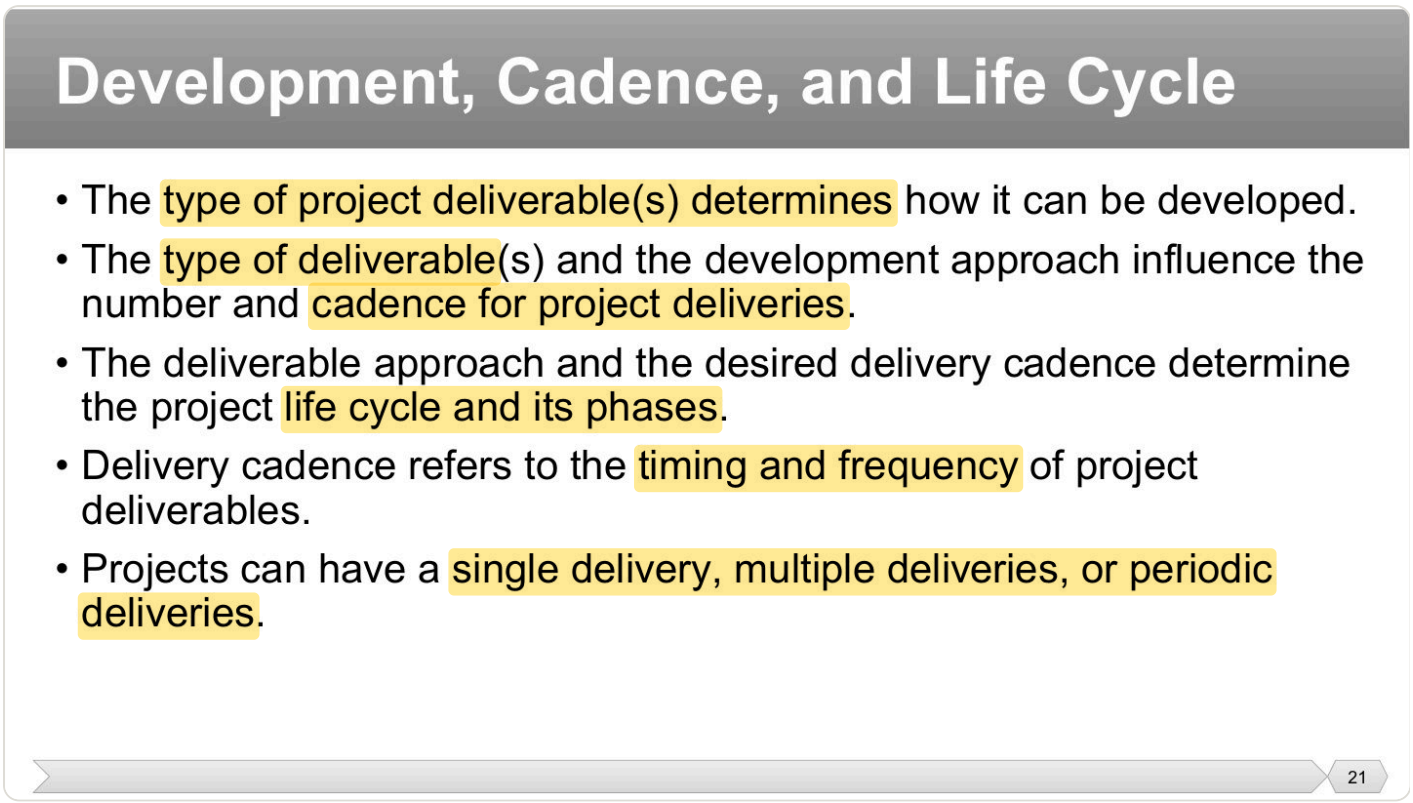
> Cadence is the rhythm of activities (single, multiple, periodic or continuous delivery) that keeps the work coordinated. (Also Midterm 251 V2 MCQ 5.)

B To enforce strict deadlines that cannot be adjusted under any circumstances.

C To eliminate the need for stakeholder engagement during development.

D To ensure that all deliverables are produced only at the end of the project.

 Development, Cadence, and Life Cycle



NOTES

1. Everything flows from what you're making. Software can be released in pieces, but half a bridge is useless. So the **type of deliverable** limits your options before anyone chooses a method.

2. Once the method is chosen, it affects how often you can ship. A physical product may ship once, while a website can ship weekly. Promises to the customer about **cadence** have to respect that.

3. This is the last link in the chain: deliverable → approach and cadence → **life cycle**. If you plan monthly releases, your phases have to repeat monthly. A single long "build" phase wouldn't fit.

4. "When and how often does the customer receive something?" is all this means. Don't confuse it with **cadence** in general, which covers any rhythm of activity, such as weekly meetings. Delivery cadence is specifically about **deliveries**.

5. Pick by what the customer needs. A **single** delivery fits a one-off building, **multiple** fit a system handed over in stages, and **periodic** fit something like monthly payroll updates. Earlier deliveries mean earlier value and earlier feedback.

EXAM ANGLE

Prediction Q1

What decides how a project's deliverable can be developed?

A The number of stakeholders

> That's not what the slide says determines it.

B The team's favorite method

> A preference doesn't change what the product allows.

C The size of the budget

> Budget limits the work, but the slide starts from the type of deliverable.

D The type of deliverable

> The chain starts here: you can release half an app, but not half a bridge.

Prediction Q2

A payroll system ships an update on the first of every month. Which delivery is this?

A Multiple

> Multiple deliveries happen at different points, not on a fixed schedule.

B Periodic

> Periodic means on a fixed schedule.

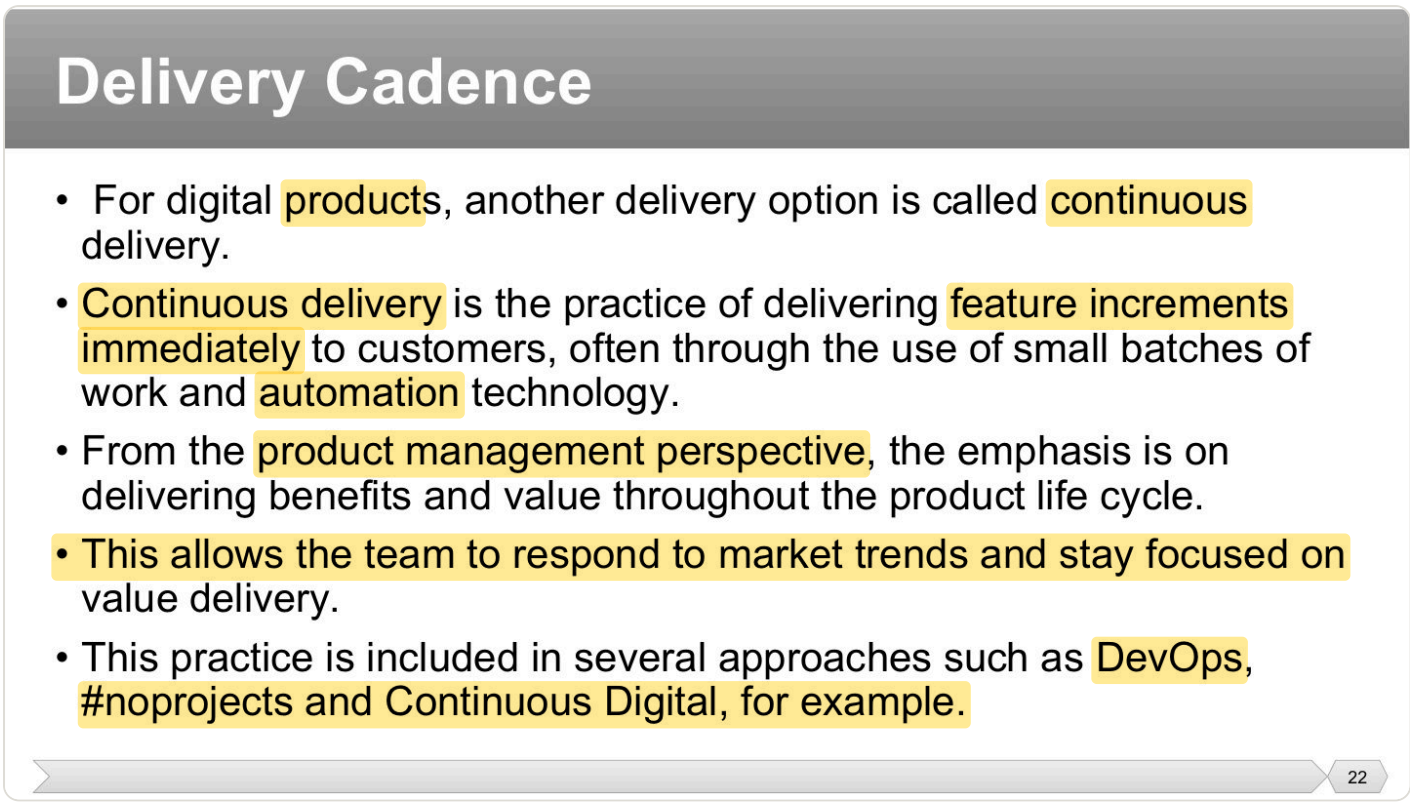
C Single

> Single means one delivery at the end.

D Continuous

> Continuous means delivering increments immediately.

 Delivery Cadence



NOTES

1. Think of apps that update without you noticing. **Continuous delivery** is only realistic for digital products, because you can't ship a physical product's improvements daily.

2. Why small batches? A small change is easy to test and easy to undo if it breaks something. **Automation** makes the frequent releasing cheap, because no person has to repeat the build and test steps each time.

3. A project mindset asks "did we finish?", while a **product** mindset asks "is it still delivering value?". With continuous delivery, the team can react to what the market wants this month, not what was planned last year.

4. You'll see this practice again under **DevOps** in Chapter 4, where development and operations work as one team. #noprojects is the extreme view that you fund ongoing products rather than one-off projects.

EXAM ANGLE

Prediction Q1

A team ships small feature increments to customers immediately, using automation. What is this?

A A phase gate

> A phase gate is a review between phases.

B Single delivery

> That’s one delivery at the end.

C Periodic delivery

> Periodic follows a fixed schedule, rather than immediately.

D Continuous delivery

> This matches the slide’s definition.

Prediction Q2

Continuous delivery is mainly an option for digital products.

T True

> The slide introduces it as another option for digital products.

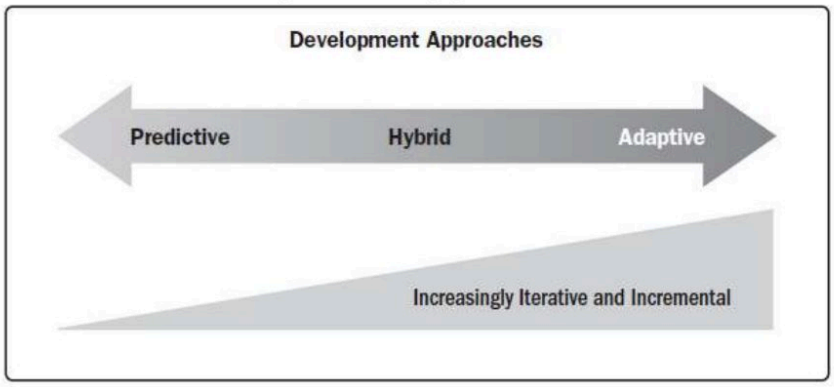
F False

> The slide specifically names digital products.

 Development Approaches

Development Approaches

- A development approach is the means used to create and evolve the product, service, or result during the project life cycle.
- There are different development approaches, and different industries may use different terms to refer to development approaches.
- Three commonly used approaches are
  - predictive,
  - hybrid, and
  - adaptive.



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NOTES

1. It's the answer to "what way of working will we use to produce this?". It isn't the tools or the team. Waterfall and agile are examples of a **development approach**.
2. If an exam or company uses an unfamiliar name, look at how the work is done, not the label. One industry's "stage-gate" may be another's "waterfall". **Different industries** use different terms, but the idea is the same.
3. The three common ones are **predictive, hybrid and adaptive**, a **spectrum** rather than three boxes: the further toward adaptive, the more iterative and incremental the work.

TIPS & TRICKS

- **HeAP**: Hybrid, Adaptive, Predictive.

EXAM ANGLE

Prediction Q1

Which statement about development approaches is correct?

A All industries use the same names

> The slide says different industries use different terms.

B Only adaptive creates the product

> All of them create and evolve the product.

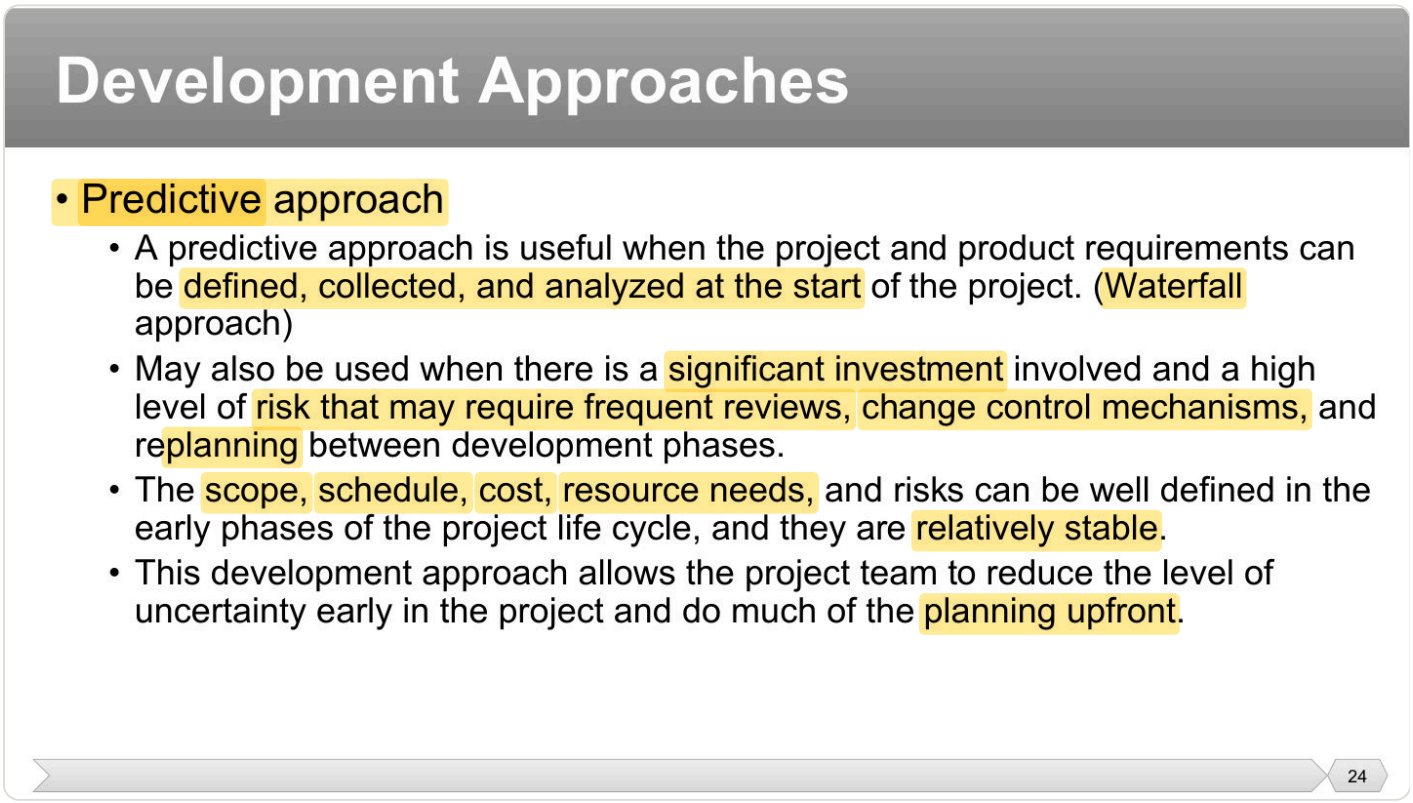
C **Predictive, hybrid and adaptive form a spectrum**

> The further toward adaptive, the more iterative and incremental.

D They are three unrelated categories

> They're points on one spectrum.

SLIDE 24 / 107 **Development Approaches**



NOTES

1 **Predictive** bets that you can know what's needed before you start, such as a building with approved blueprints. It works when requirements won't move much. It's also called **waterfall** because each stage flows into the next.

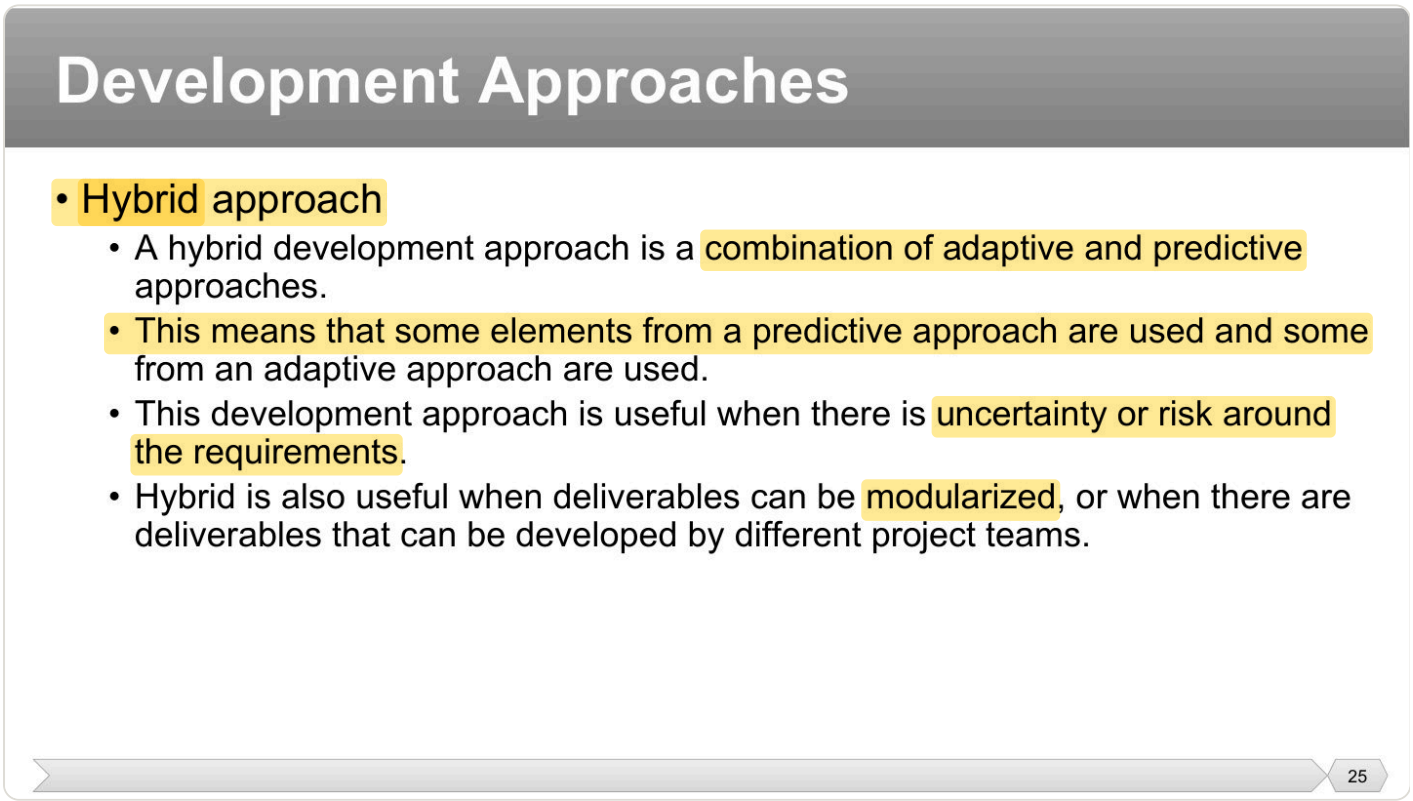
2. The second reason is about stakes, not certainty. When a mistake is very costly, like a hospital information system, you want formal checks before spending the next large sum. Heavy reviews would slow a small app down, but here they're protection.
3. Knowing these early is what makes predictive possible, because you can commit to a price and date up front. If they keep changing, those commitments keep breaking, and that's the sign you chose the wrong approach.
4. It tries to remove uncertainty before building starts, so most **planning** happens **up front**. The cost is that late changes are expensive, as you'd be undoing finished work.

EXAM ANGLE

Prediction Q1

A government payroll system must implement fixed legal rules that will not change during the project. Which development approach fits, and why?
Answer: Predictive (waterfall): the requirements can be defined and analysed at the start and are stable, so scope, schedule and cost can be planned up front with phase reviews and change control.

SLIDE 25 / 107 **Development Approaches**



NOTES

1. **Hybrid** is about mixing, not compromising. You use the predictive way where things are stable and the adaptive way where they aren't, in the same project.
2. It's useful when you're sure about some parts and not others. A payment system's rules may be fixed by law, while its user interface needs trying out with real users. Using one approach for both would be wrong for one of them.

3. Pieces that can be built separately can be run differently. **Modularized** means the parts connect but don't depend on each other's way of working, like a fixed back-end integration planned predictively with a user-facing app built in sprints.

EXAM ANGLE

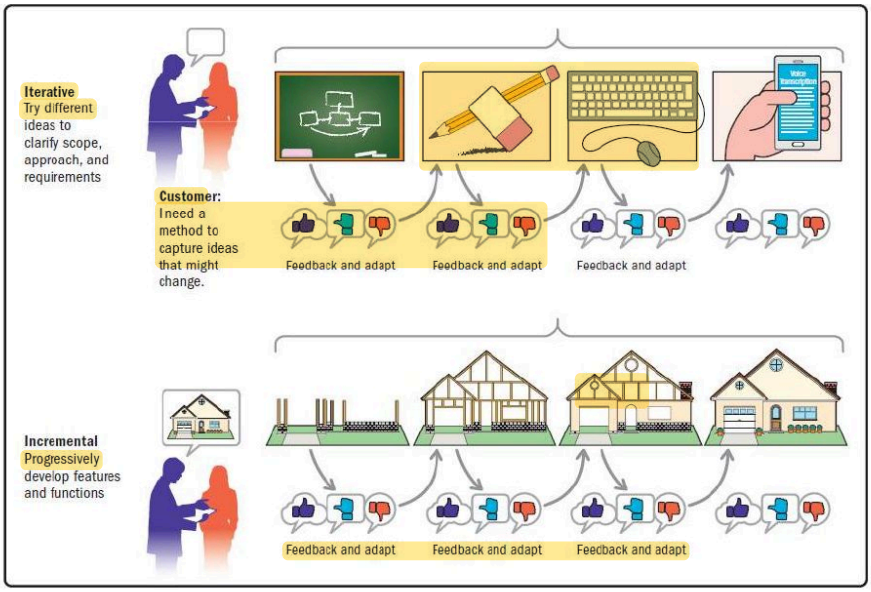
Past exam · Midterm 251 · V1 · Case Q2 — Q1

Edugate scheduling system: given the evolving requirements (student usability, advisor requests, IT integration rules), which development approach (Agile, Waterfall, or Hybrid) would you recommend, and why would it be the best fit for this project?
Answer: Agile (Scrum) (0.5), because it handles the evolving requirements from students, advisors and IT, delivers iteratively so each sprint gets feedback, and integrates with DevOps pipelines for frequent tested releases (0.5). (A hybrid answer that plans the fixed IT integration predictively and builds the student-facing features iteratively is also well argued.) The instructor's key gives Agile (Scrum).

SLIDE 26 / 107 **Iterative vs. Incremental**

Development Approaches

- Hybrid approach



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NOTES

1. **Iterative** (top row): try different ideas to clarify scope, approach and requirements, refining the **same** thing after each round of feedback (sketch → mock-up → prototype → app). The customer needs a way to capture ideas that might change.

2. **Incremental** (bottom row): progressively **add new** features and functions, each a working piece (foundation → frame → walls → finished house), with feedback after each increment. Adaptive approaches use both. Iterative refines; incremental adds.

EXAM ANGLE

Prediction Q1

Adding one new working feature to the product in each cycle is best described as:

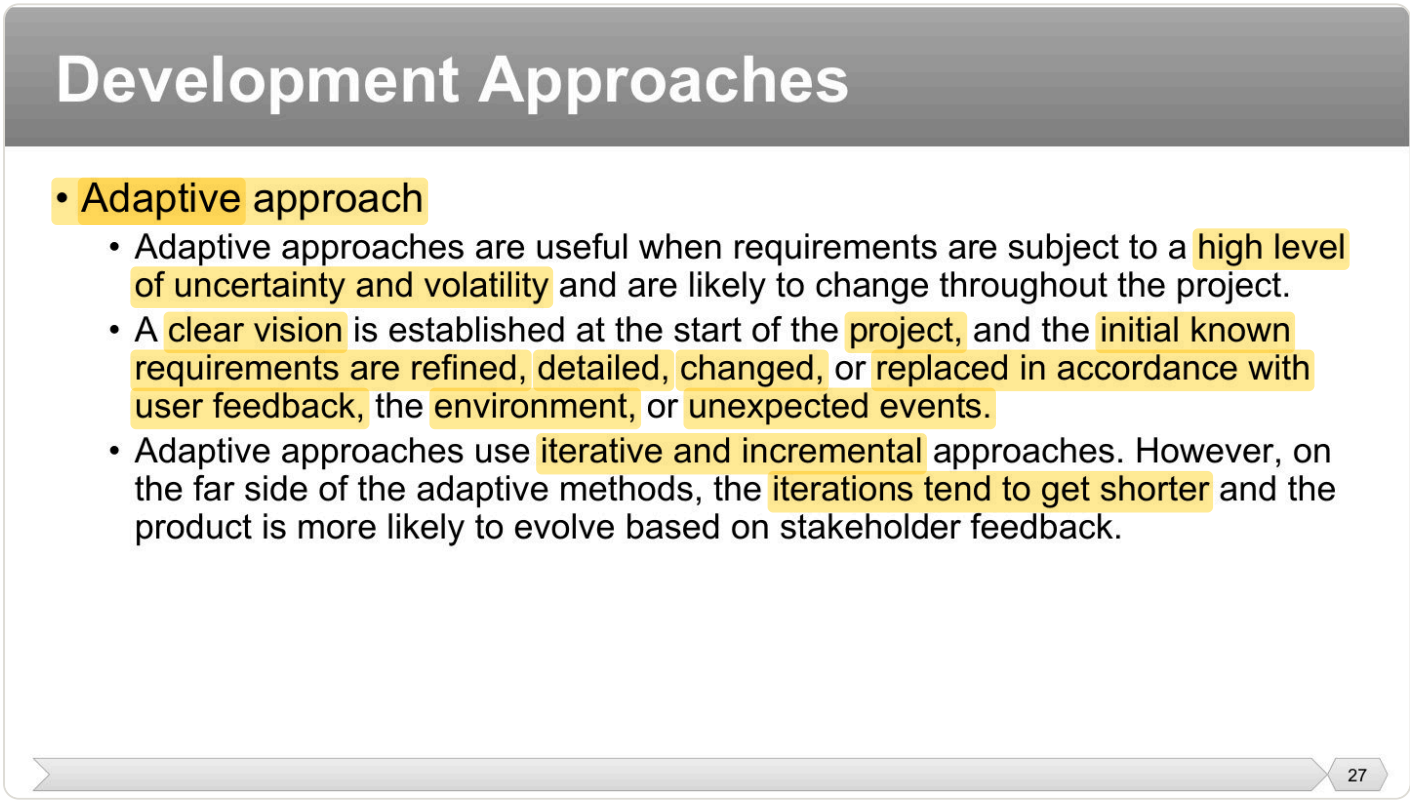
A Predictive development

B Iterative development

C **Incremental development**

D Waterfall development

SLIDE 27 / 107 **Development Approaches**



NOTES

1. **Adaptive** assumes that you can't know everything up front, so it doesn't pretend to. It suits new products, where users themselves don't yet know what they want until they try something.
2. Not knowing the details doesn't mean having no direction. The **clear vision** is the fixed point, like "students can register online in under a minute". The features that achieve it can change as you learn from user feedback.
3. Adaptive work repeats (**iterative**) and grows (**incremental**). The further toward the adaptive end, the shorter each cycle gets, since shorter cycles mean faster correction when you're wrong.

EXAM ANGLE

Past exam · Midterm 251 · V1 · MCQ 6 Q1

In which type of project would an iterative development approach be most beneficial?

A **A project where requirements are unclear and expected to evolve over time.**

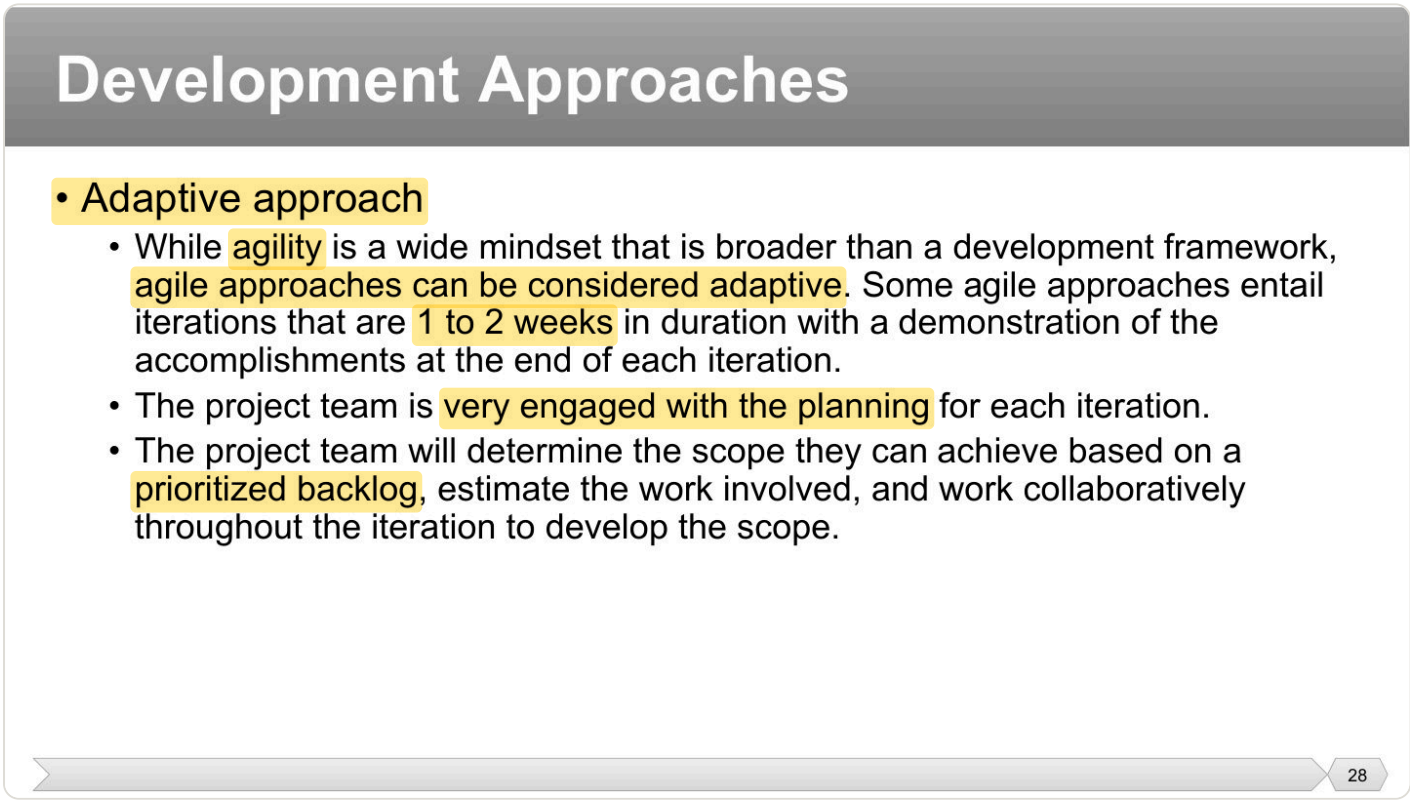
> Iterative development refines ideas through feedback, which suits unclear or evolving requirements. (Also Midterm 251 V2 MCQ 6.)

B A project with well-defined, unchanging requirements from the start.

C A project that must deliver the entire product only at final completion.

D A project that cannot accommodate stakeholder feedback during execution.

SLIDE 28 / 107 **Development Approaches**



NOTES

1. A framework is a set of steps, while **agility** is an attitude of responding to change. A team can follow every Scrum ritual and still not be agile. The **1–2 week iterations** ending in a demo force real progress to be shown often.

2. People commit more to plans they helped make, and they know the real effort better than anyone else. That's why the **team plans** each iteration in agile, rather than receiving a plan from above.

3 Because the backlog is **prioritized**, the most valuable work comes first and whatever doesn't fit is the least important. If time runs out, you lose the least. The team sets the amount it takes on, which makes its promise realistic.

EXAM ANGLE

Prediction Q1

Who determines the scope for an agile iteration?

A The team, based on a prioritized backlog

> The team decides what it can achieve and estimates the work.

B The customer alone, with no team input

> The team's estimate is central to this.

C The sponsor, based on the budget

> The sponsor doesn't pick iteration scope here.

D The PMO, based on a template

> A template doesn't set iteration scope.

Prediction Q2

Agility is simply another name for the Scrum framework.

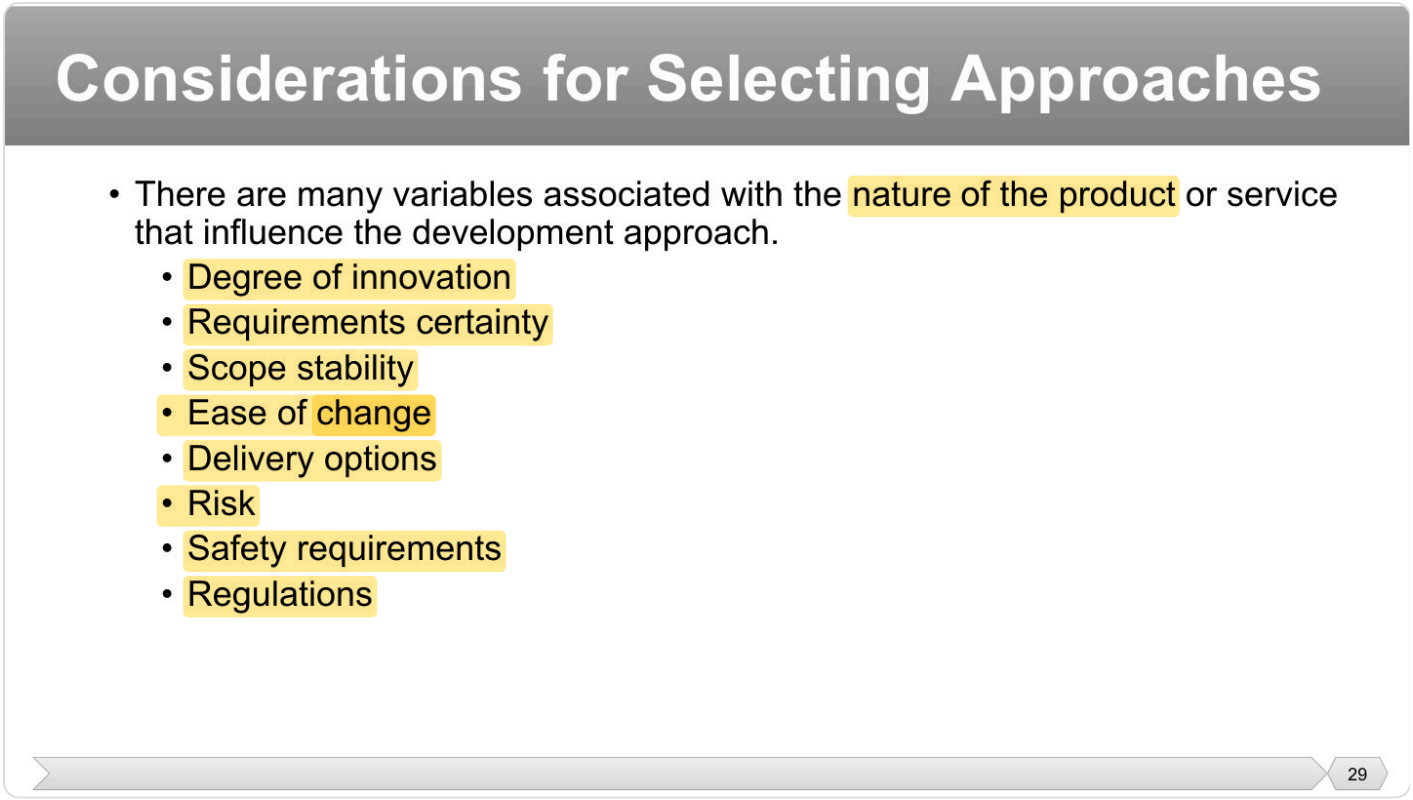
T True

> The slide says agility is broader than a framework.

F False

> Agility is a wide mindset that is broader than any development framework.

 Considerations for Selecting Approaches



NOTES

1. The common thread is how much you can know in advance and how cheaply you can change. New ideas, unclear requirements and easy changes all favor learning as you go, like a mobile app. Rule of thumb: high **innovation**, uncertain **requirements**, unstable **scope**, easy **change** and frequent **delivery options** push toward adaptive.
2. Strict **safety requirements** and **regulations** push toward predictive (they need documented, controlled phases).

TIPS & TRICKS

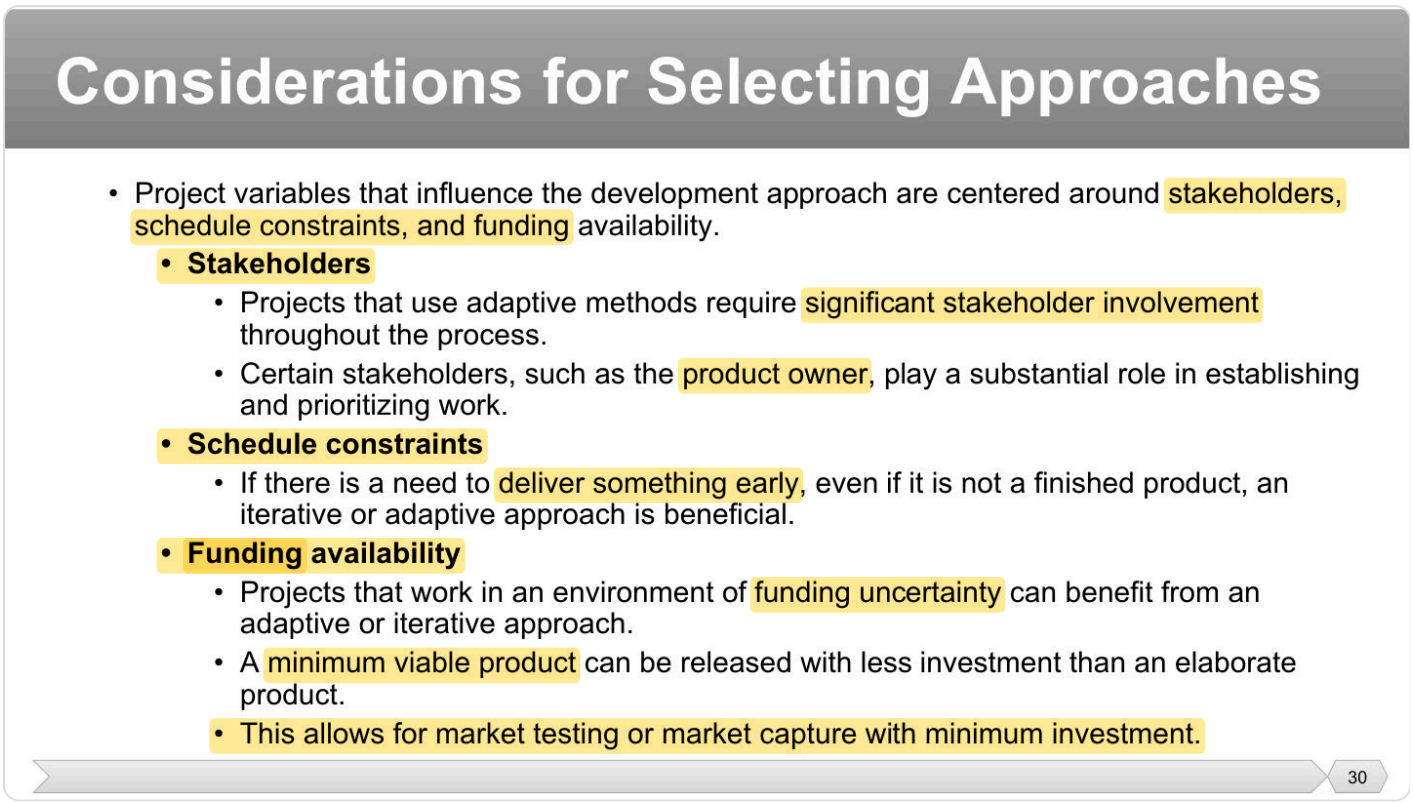
- Sentence, in slide order: **D**on't **R**ush **S**cope: **E**very **D**elivery **R**isks **S**afety **R**ules. Degree of innovation, Requirements certainty, Scope stability, Ease of change, Delivery options, Risk, Safety requirements, Regulations.

EXAM ANGLE

Prediction Q1

A medical device must meet strict safety regulations and its requirements are stable. Which way do these product variables push the development approach?
Answer: Toward predictive: strict safety requirements and regulation, plus certain and stable requirements, favour up-front planning, documented phases and phase-gate reviews.

 Considerations for Selecting Approaches



NOTES

1. The product isn't the only factor. Even for the same product, the approach can change depending on who's involved, how soon something is needed and how the money arrives. These are the three project variables to name: **stakeholders, schedule constraints and funding availability**.

2. Adaptive only works if someone is available to answer questions and give feedback every week. A busy customer who only wants to see the final result is a warning sign. A **product owner** fills this role by deciding what comes next.

3. Imagine needing to show something at a trade fair in six weeks while the full product takes a year. Delivering something usable **early** only works when the work is split into cycles, which a single big delivery can't give you.

4. If next quarter's money isn't certain, a big plan risks being stopped halfway, with nothing usable. Working in cycles means there's always something finished, so you lose less if **funding** stops...

5. ...and there's a further benefit: an **MVP** is the smallest version worth releasing. Releasing it tests the idea cheaply, and if the market responds well, that success can help secure more funding.

TIPS & TRICKS

- **SaFeS**: Stakeholders, Funding availability, Schedule constraints.

EXAM ANGLE

Prediction

Q1

An adaptive project has a busy client who won't attend reviews. What concern does the slide raise?

A Funding increases automatically

> Nothing here affects the funding.

B Schedule constraints get removed

> Absent stakeholders don't remove schedule limits.

C The team can't self-organize

> The issue is stakeholder involvement.

D Adaptive methods need significant stakeholder involvement

> Without it, the approach loses its feedback.

Prediction

Q2

Funding for next year is uncertain. Which approach does the slide favor, and why?

A Adaptive or iterative, because an MVP can be released with less investment

> A smaller release can test the market with less money.

B Hybrid, because contracts are cheaper

> The slide says nothing about contract prices.

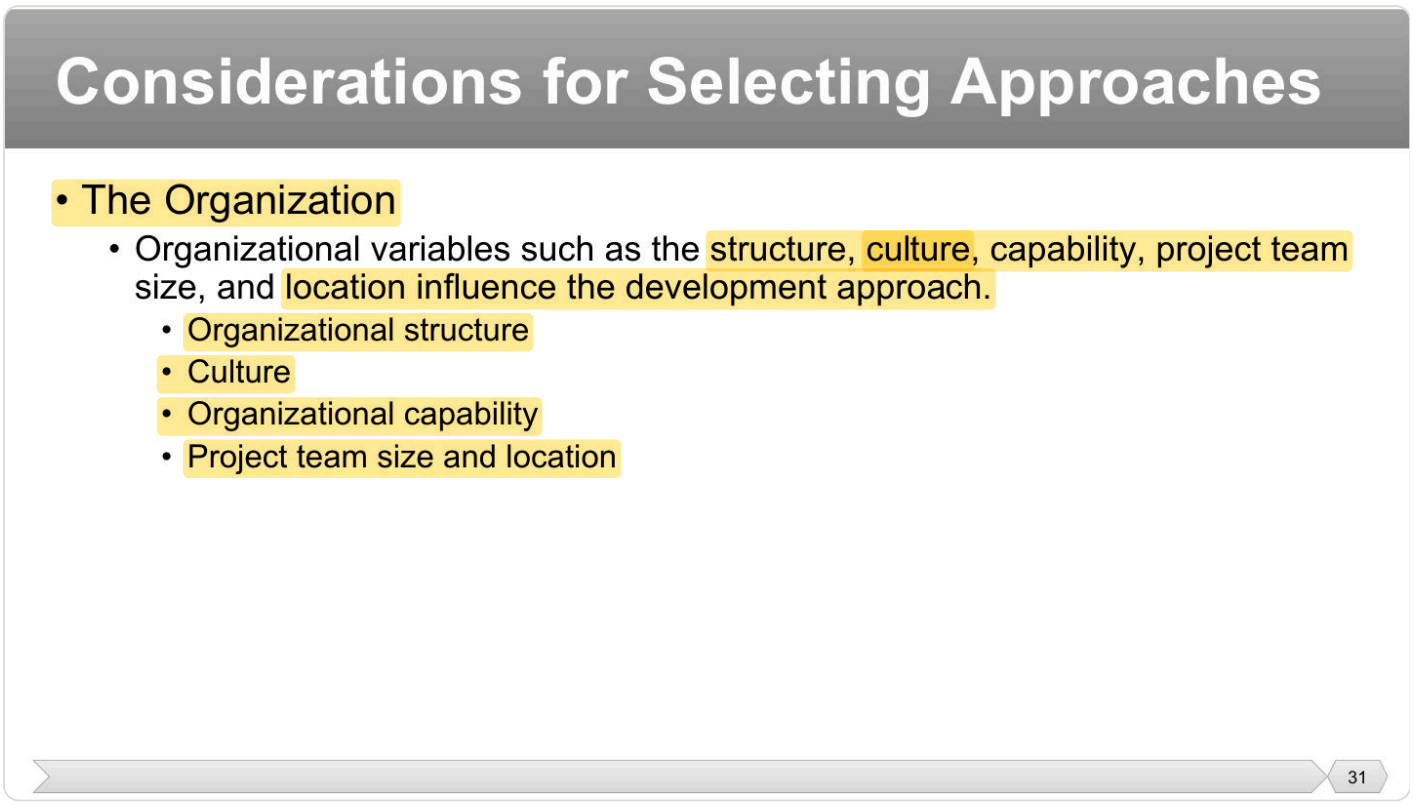
C Predictive, because it reduces stakeholder involvement

> That doesn't address uncertain funding.

D Predictive, because everything is planned up front

> A big up-front plan is what's at risk when funds might stop.

 Considerations for Selecting Approaches



NOTES

1. Even if the product suits an approach, the organization has to be able to run it. Skills, habits and how the company is arranged can all make an approach fail, so **structure, culture, capability, team size and location** all count.

2. A strongly hierarchical, documentation-heavy culture struggles with adaptive work; a small co-located team adopts it easily; large or distributed teams need more structure.

TIPS & TRICKS

- **SuCCeSs**: Structure, Culture, Capability, Size and location of the team.

EXAM ANGLE

Prediction Q1

Which is an organizational variable that influences the development approach?

A Team size and location

It's on the slide's list, with structure, culture and capability.

B Degree of innovation

That's a product variable, from slide 29.

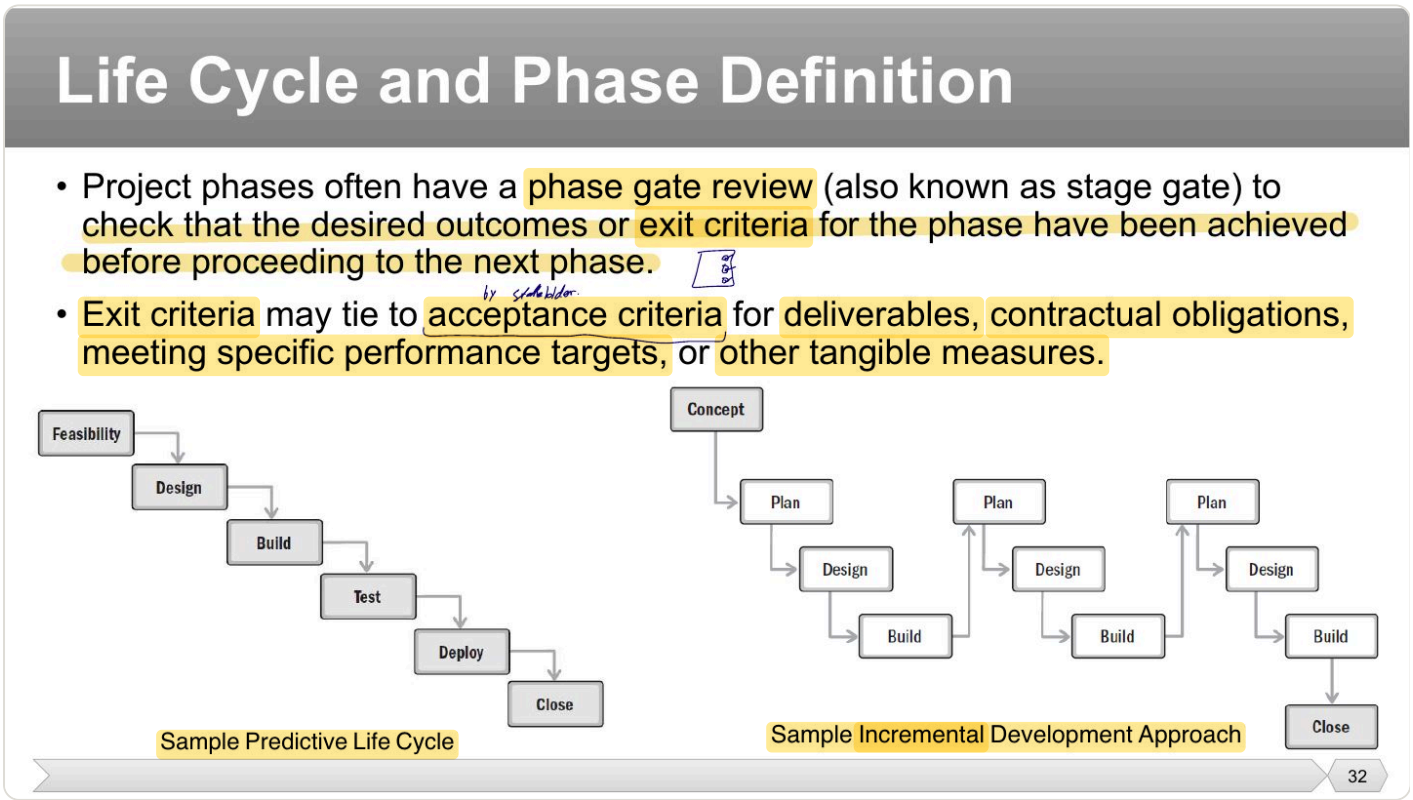
C Safety requirements

That's a product variable, from slide 29.

D Funding availability

That's a project variable, from slide 30.

SLIDE 32 / 107 **Life Cycle and Phase Definition**



NOTES

1 A **phase gate** stops a project from rolling on by momentum. Before spending on the next phase, someone asks "did we actually get what this phase was meant to produce?". If not, you fix it or stop, which is cheaper than finding out later.

2. **Exit criteria** have to be checkable, or the gate means nothing. “Design is mostly done” can’t be verified, while “all designs are approved and 95% of test cases pass” can, and that’s why they’re tied to **acceptance criteria** or contract terms.

3. The diagrams: a **predictive** life cycle (feasibility → design → build → test → deploy → close, one phase after another) and an **incremental** one (plan → design → build repeated, each round delivering an increment).

EXAM ANGLE

Prediction Q1

What is checked at a phase gate?

A Whether everyone likes the plan

> It’s based on criteria, not preference.

B Whether the team has self-organized

> That isn’t what a phase gate reviews.

C Whether the phase’s desired outcomes or exit criteria have been achieved

> That’s the purpose of the gate.

D Whether the project should use agile

> A gate reviews a phase’s results, not the method.

Prediction Q2

Exit criteria can be tied to contractual obligations.

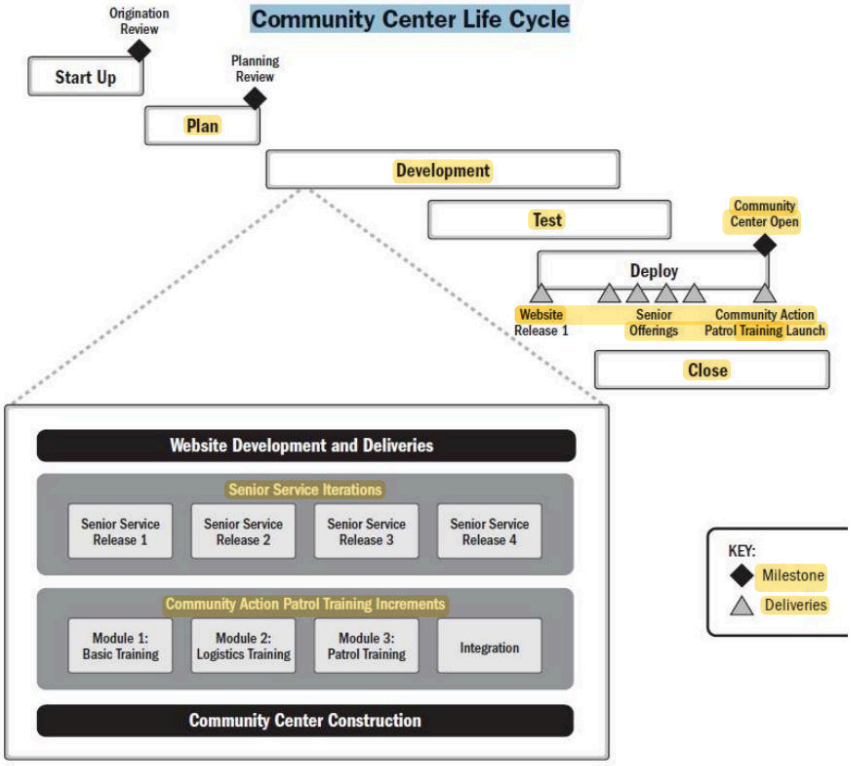
T True

> They may tie to acceptance criteria, contractual obligations or performance targets.

F False

> The slide lists contractual obligations as an example.

A hybrid life cycle: the community center



NOTES

1. A real **hybrid** example. The community center building follows predictive phases with milestone reviews: start up → plan → development → test → deploy → close.

2. Inside development, the **website** is delivered in iterations (senior service releases 1–4) and the **training** (community action patrol modules 1–3 and integration) in increments, while construction proceeds predictively. One project, different approaches for different deliverables.

EXAM ANGLE

Prediction Q1

In the community center example, why is this a hybrid project?

A Everything is delivered at the end

> Parts are delivered in iterations and increments.

B All work is done in sprints

> The building follows predictive phases.

C Different deliverables use different approaches

> Construction is predictive, while the website and training are iterative or incremental.

D Nothing is planned up front

> The overall project has planned phases and reviews.

SLIDE 34 / 107 **Checking Outcomes: Development Approach and Life Cycle**

Checking Outcomes—Development Approach and Life Cycle Performance Domain

Outcome	Check
Development approaches that are consistent with project deliverables	The development approach for deliverables (predictive, hybrid, or adaptive) reflects the product variables and is appropriate given the project and organizational variables.
A project life cycle consisting of phases that connect the delivery of business and stakeholder value from the beginning to the end of the project	Project work from launch to close is represented in the project phases. Phases include appropriate exit criteria.
Project life cycle phases that facilitate the delivery cadence and development approach required to produce the project deliverables	The cadence for development, testing, and deploying is represented in the life cycle phases. Projects with multiple deliverables that have different delivery cadences and development methods are represented by overlapping phases or phase repetitions, as necessary.

NOTES

1. The “checking outcomes” table: the left column is what success looks like for the domain, the right column is the evidence that it happened. You won’t be asked to reproduce it, but it is a good structure for a written answer about the domain. Development approach and life cycle: approaches **consistent with the deliverables** (an approach that suits each product), a life cycle that **delivers value from start to end**, and phases that **support the delivery cadence**.

EXAM ANGLE

Prediction Q1

In this domain, what does an appropriate approach need to be consistent with?

A The cost baseline

> A baseline isn’t what the approach must fit.

B The contingency reserve

> A reserve is a budget matter.

C **The deliverables**

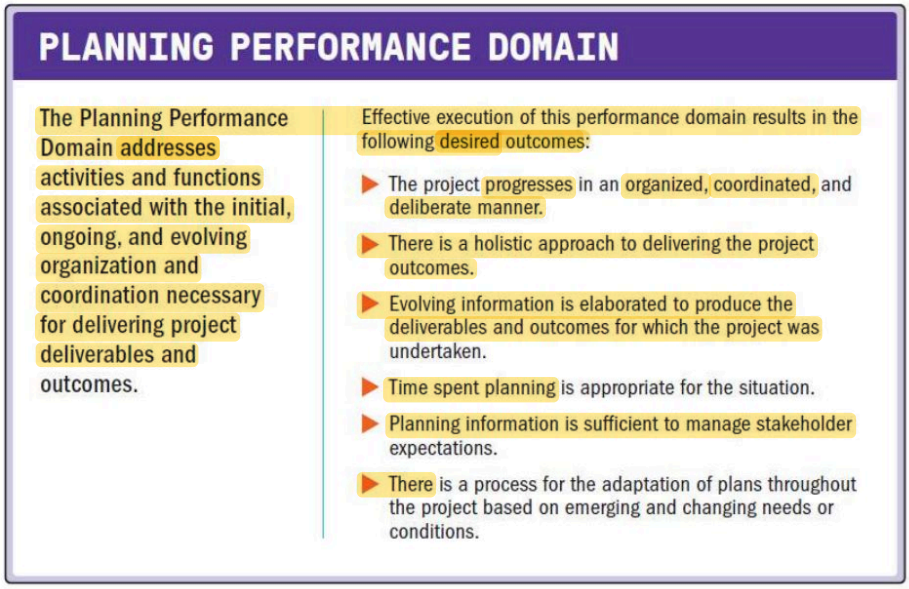
> The approach should suit each thing being produced.

D The team’s preferred tools

> Tools aren’t what the table checks here.

 Planning Performance Domain

Planning Performance Domain 4



35

NOTES

1 Desired outcomes: the project progresses in an organized, coordinated way; a holistic approach to delivery; evolving information elaborated over time; **planning time appropriate** for the situation (not over-planning); enough information to manage stakeholder expectations; and a process to **adapt plans** as needs change.

EXAM ANGLE

Prediction Q1

Which is a desired outcome of the Planning domain?

A All details fixed on day one

> Information is elaborated over time.

B A plan that never changes

> One outcome is a process to adapt plans.

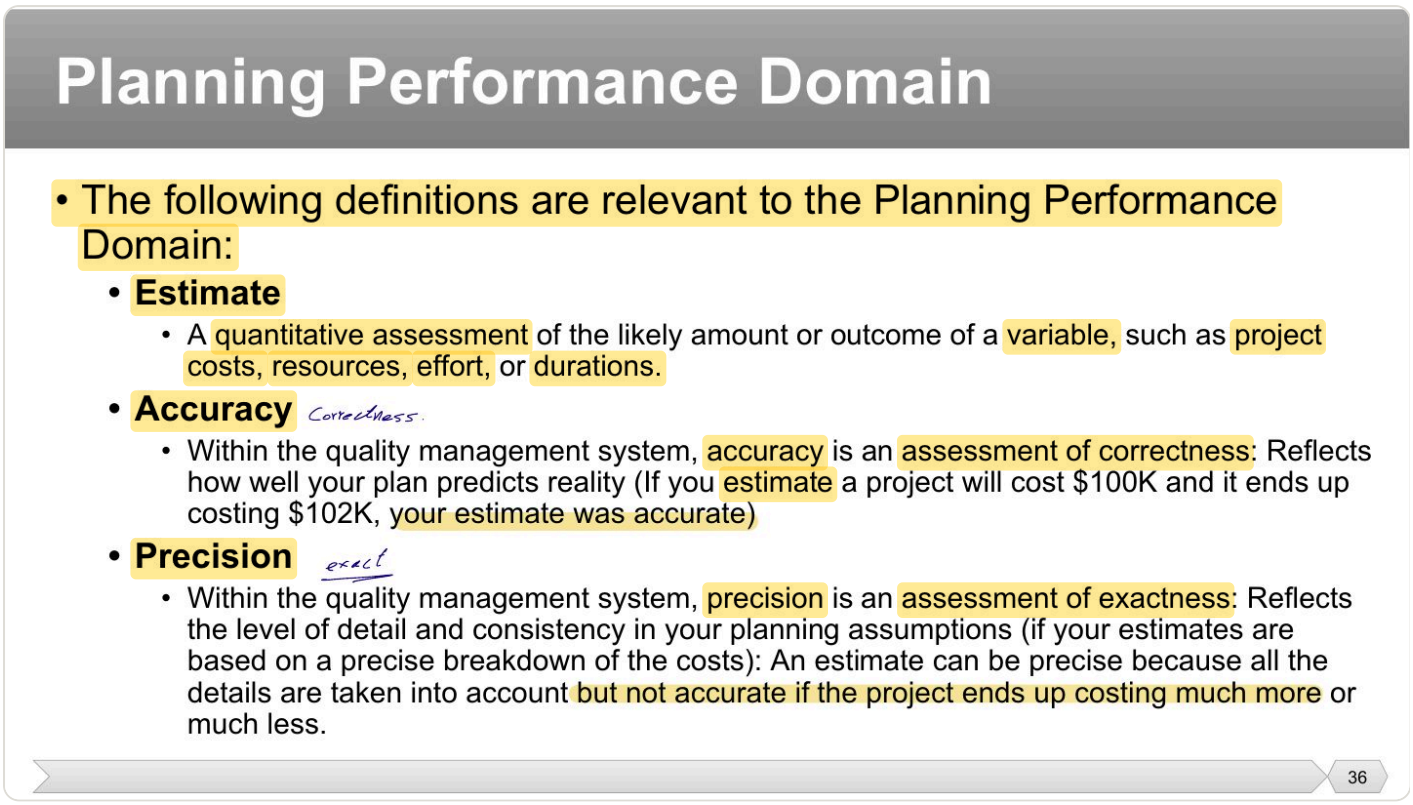
C Maximum possible time spent planning

> The outcome warns against over-planning.

D **Planning time appropriate for the situation**

> Too much planning is also a failure, so the amount should fit.

 Planning Performance Domain



NOTES

1. An **estimate** is an informed number, not a promise or a guess, and it should come with a basis. "About 40 days, based on two similar projects" can be challenged and improved, while "it'll take a while" can't.
2. **Accuracy** asks one question: was it right? Estimate $100K, actual $102K → accurate, because the estimate landed close to reality, however rough it was.
3. **Precision** = **exactness**: how detailed and consistent the estimate is. A precise estimate (every cost broken down) can still be **inaccurate** if the project ends up costing much more. Accurate = hits the target; precise = tightly grouped.

EXAM ANGLE

Prediction Q1

An estimate built from a detailed, line-by-line cost breakdown ends up 40% over the actual cost. The estimate was:

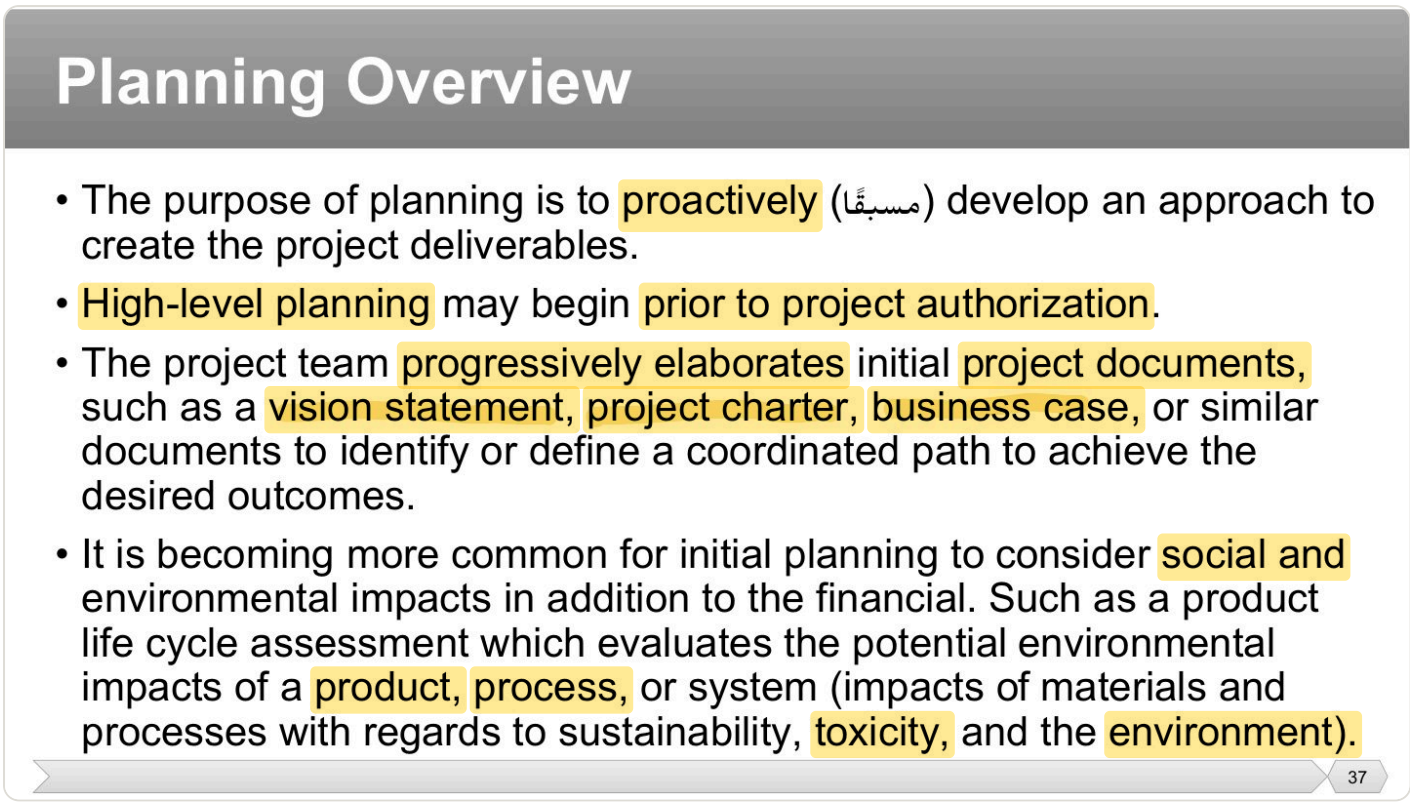
A Neither accurate nor precise by definition

B Accurate but not precise

C Both accurate and precise

D **Precise but not accurate**

 Planning Overview



NOTES

1. **Proactively** is the key word. Planning means deciding before problems force you to, as it's far cheaper to choose an approach now than to change course mid-build.

2. It sounds backwards to plan before approval, but someone must estimate cost and benefit so leaders can decide whether to authorize it at all. That's why **high-level planning** comes first, in the business case.

3. **Progressively elaborates** means adding detail as you learn, rather than guessing everything on day one. A vision statement becomes a charter, then a detailed plan, each more specific because more is now known.

4. A project can be profitable and still cause harm, like a product that's hard to dispose of. Considering **social and environmental** impact early is cheaper than fixing it later, and customers and regulators increasingly expect it.

EXAM ANGLE

Prediction Q1

Why might planning begin before a project is authorized?

A Planning is only allowed before approval

> It continues throughout the project.

B Detailed schedules are always known by then

> Details come later through elaboration.

C The team wants to skip the charter

> Planning early doesn't replace authorization.

D High-level planning is needed to support the decision, such as the business case

> Leaders need estimates to decide.

Prediction Q2

A vision statement is expanded into a charter, and then a detailed plan. What is this?

A Fast-tracking

> Fast-tracking runs activities in parallel.

B Scope creep

> Scope creep is uncontrolled growth in scope, not adding planning detail.

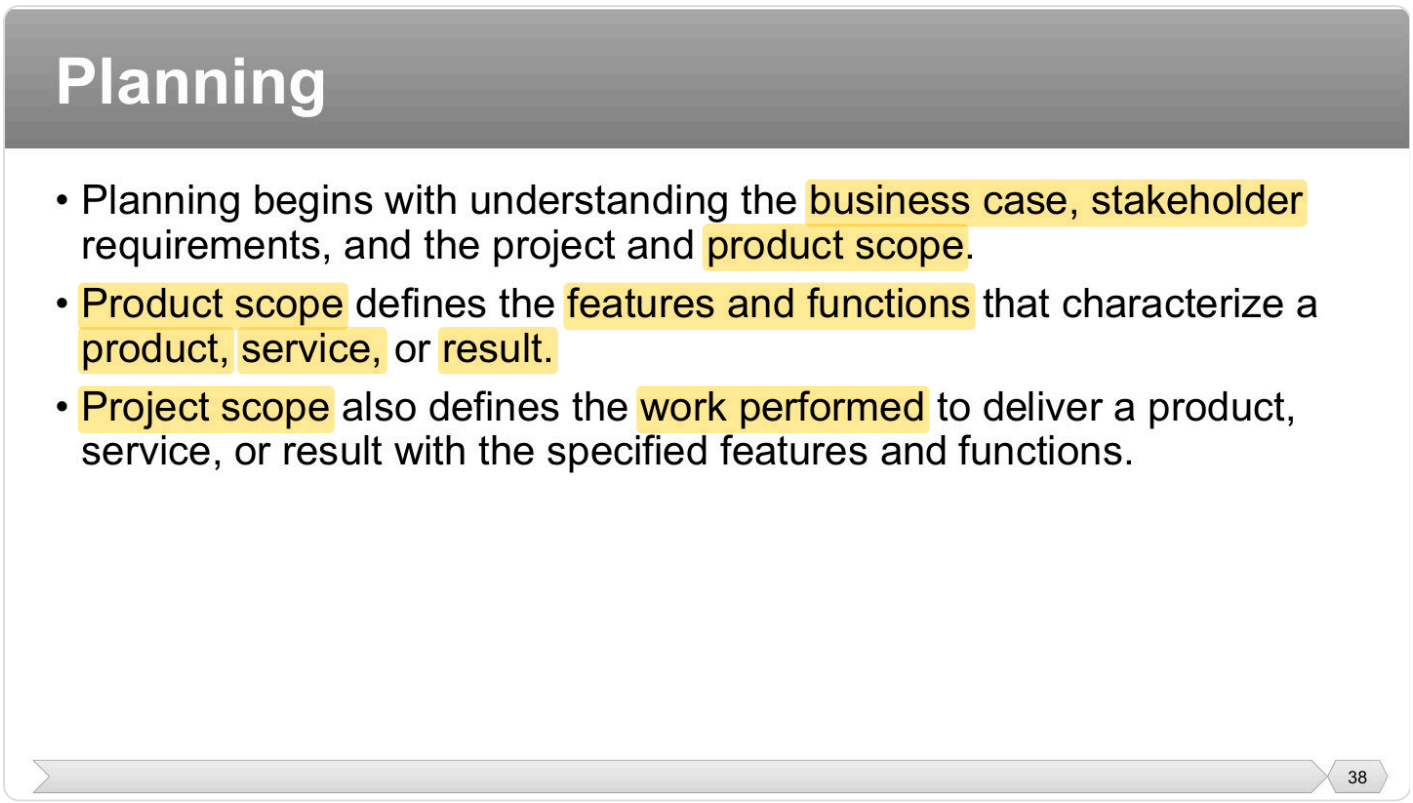
C Progressive elaboration

> Detail gets added as more is learned.

D Decoupling

> Decoupling separates parts of a system.

 Planning



NOTES

1. You can't plan a route without knowing the destination. The **business case** says why we're doing this, requirements say what people need, and scope says what's included. Skipping these means planning the wrong thing very well.

2. Ask: "what will the finished thing have?" For a banking app, login, transfers and statements are **product scope**. It describes the result, and says nothing about how the team gets there.

3. **Project scope**: the **work** performed to deliver it (what the team must do). Don't swap them; near-identical terms are the instructor's favourite trap.

EXAM ANGLE

Past exam · Final 251 · Q1.3 Q1

Describe the significance of a project scope statement in project management and elaborate on how it aids in mitigating project risks and ensuring successful project outcomes.

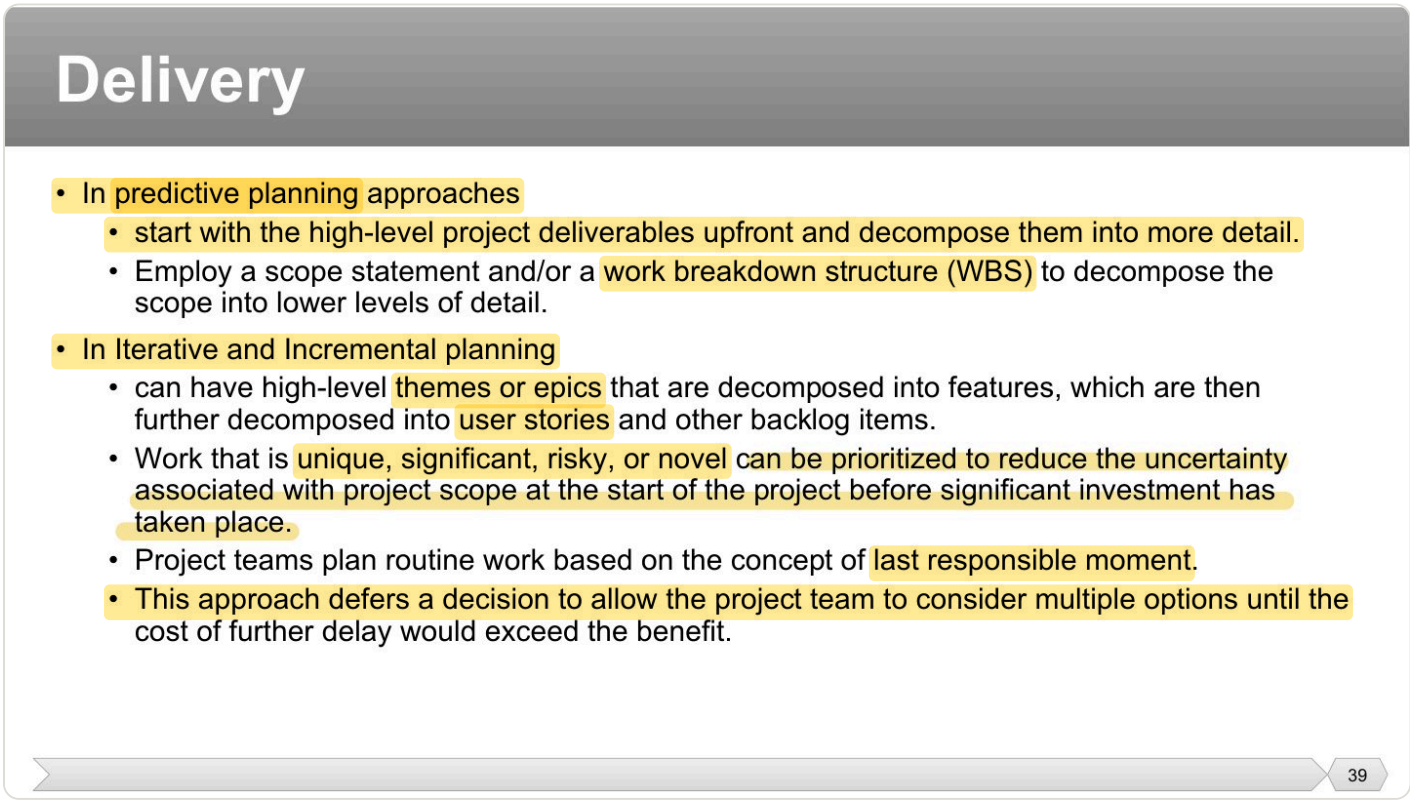
Answer: The scope statement defines what the project will and won't deliver: objectives, deliverables, acceptance criteria, exclusions, assumptions and constraints. It reduces risk because everyone agrees on the boundaries up front, it's the baseline for change control (so scope creep is caught and evaluated rather than absorbed), and it's the basis for the WBS, estimates and schedule. That leads to realistic plans and a result the stakeholders will accept.

Prediction Q2

"The work performed to deliver a product, service, or result with the specified features and functions" defines:

- **A Project scope**
- B Cadence
- C The business case
- D Product scope

SLIDE 39 / 107 **Delivery**



NOTES

1. If you know what you need, you can break it down from the top. The **WBS** is like an outline: a building becomes floors, floors become rooms, rooms become tasks. Small pieces are what you can estimate and assign.
2. Here the breakdown happens gradually. An **epic** like “online payments” is split into features, then **user stories** like “as a customer, I can save my card”. Only the near-term items get broken down, as later ones may change.
3. If something might fail, you want to find out early and cheaply. Doing the **risky or novel** work first means that if the new technology won’t work, you learn it before you’ve spent most of the budget.
4. Deciding too early means deciding with less information. **Last responsible moment** means waiting until just before further delay would start costing more, like booking a venue only once the date is certain, but before they sell out.

EXAM ANGLE

Prediction

Q1

Deferring a decision until the cost of further delay would exceed the benefit of waiting is called:

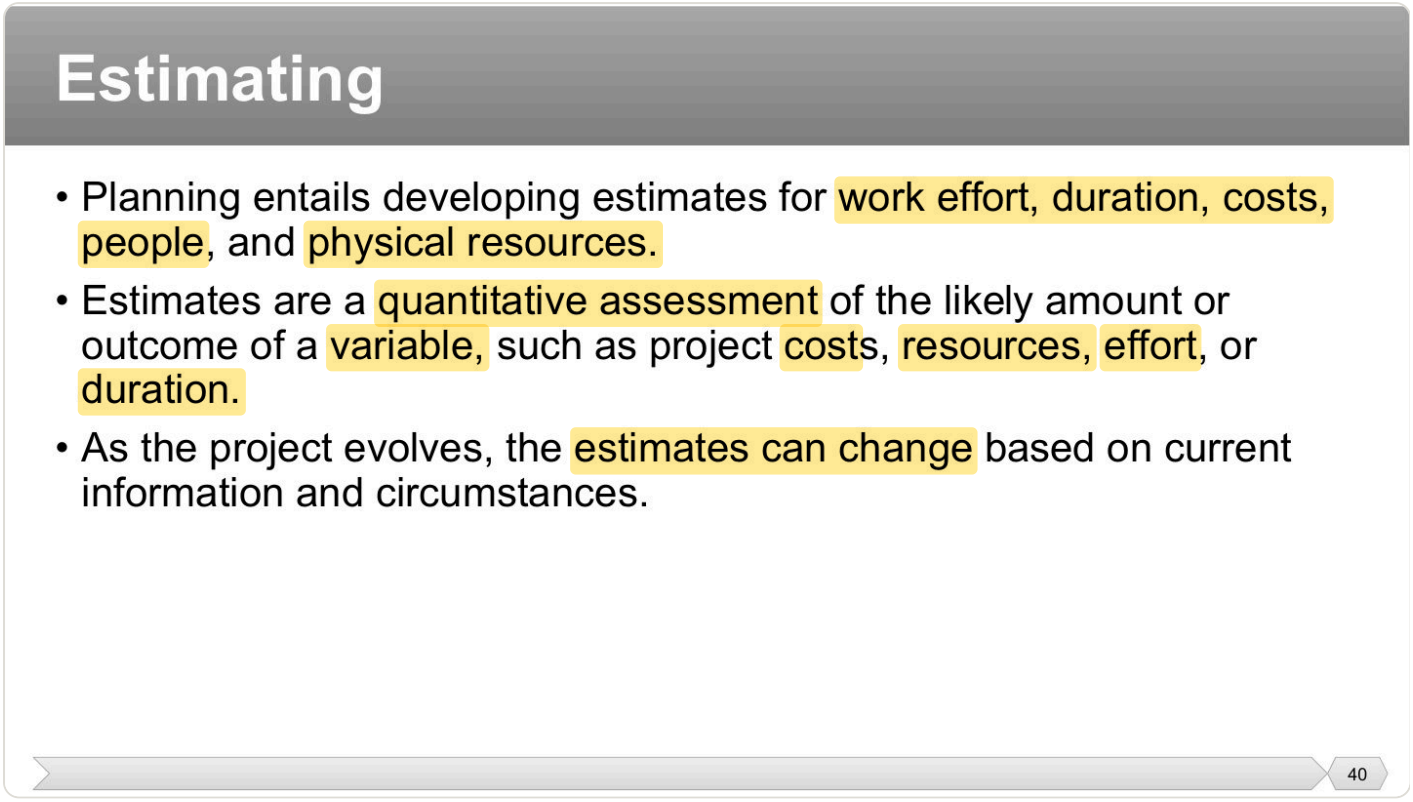
A Fast-tracking

B A phase gate

C **The last responsible moment**

D A management reserve

 Estimating



NOTES

1. You need these numbers to answer "can we afford this, and when will it finish?". Each one feeds something else: **effort** and people give duration, and duration and rates give **cost**.
2. **Quantitative** means a number you can use and compare, such as 40 days or $5,000. Saying "it's a big task" doesn't let anyone plan.
3. An early estimate is rough because you know little, so expecting it to hold is unrealistic. **Estimates change** as you learn, and updating them is good practice, not failure (the "cone of uncertainty" in Chapter 6).

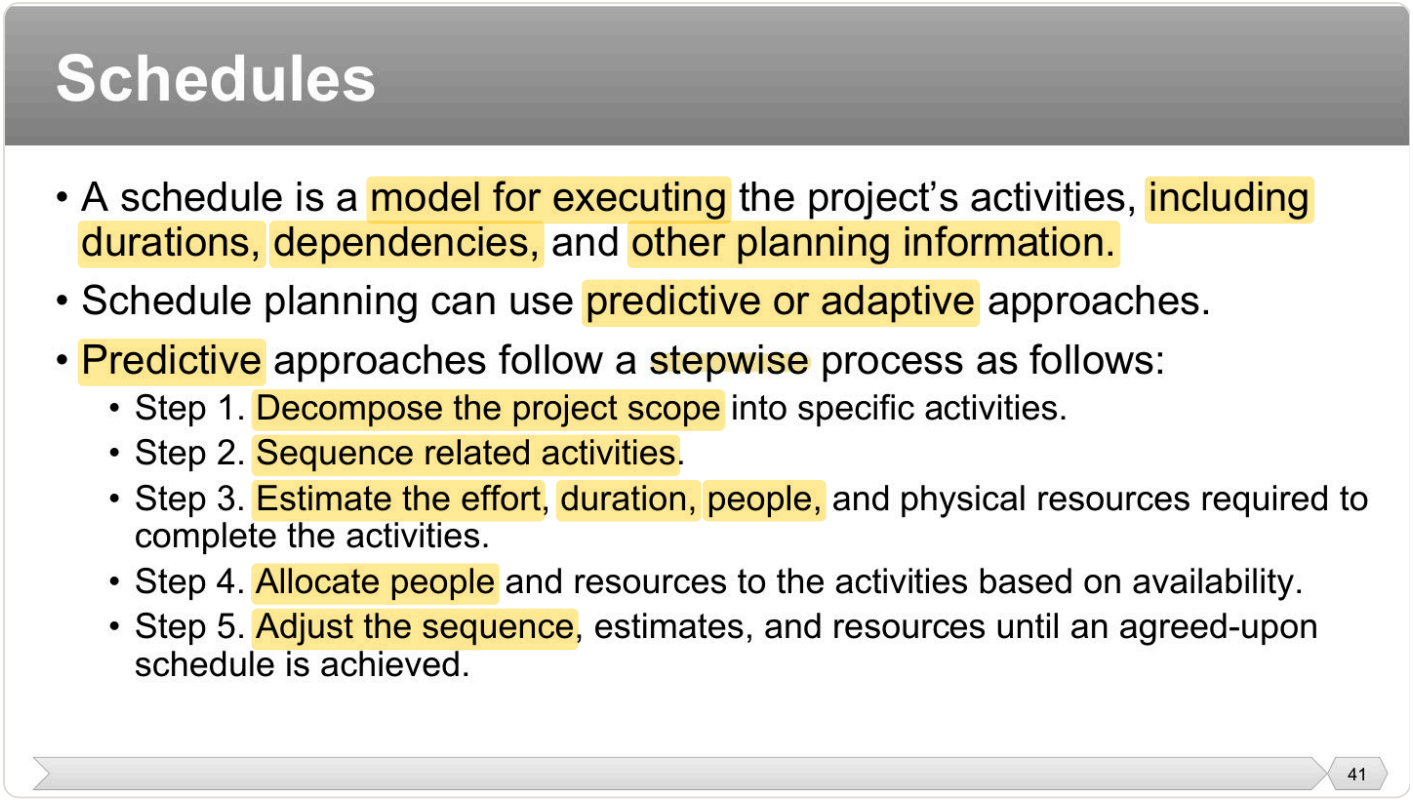
EXAM ANGLE

Past exam · Final 242 · Q2.2 Q1

To plan accurately for the design, prototyping, and testing phases, you need to estimate the time and effort required. Choose two effort estimation techniques you would apply to this project. Explain how each technique supports better planning and risk control in this scenario.

Answer: Three-point (PERT) estimation: each design, prototyping and test activity gets optimistic, most-likely and pessimistic values, (O + 4M + P) / 6, so the plan reflects the uncertainty of hardware prototyping and the spread shows where contingency is needed. Delphi / expert judgment: hardware and software experts estimate anonymously and converge over rounds, which brings in experience with regulatory testing and removes single-person bias. Comparing the two estimates cross-checks them and exposes risky tasks early. Chapter 6 teaches the techniques.

 Schedules



NOTES

1. A **schedule** is called a **model** because it's a simulation of how the work should unfold. Change one duration and you can see what moves. It isn't just a list of dates.
2. The schedule isn't always a fixed sequence of dates. **Predictive** fixes the plan up front, while **adaptive** plans in short cycles and adjusts. Which one you use follows from your development approach.
3. Each step needs the one before. You can't order activities you haven't listed, you can't estimate resources before knowing what they do, and you can't allocate people without estimates. Decompose → sequence → estimate → allocate → adjust.

TIPS & TRICKS

- The order matters here: **D**ogs **S**neak **E**very **A**pple **A**way. Decompose, Sequence, Estimate, Allocate, Adjust.

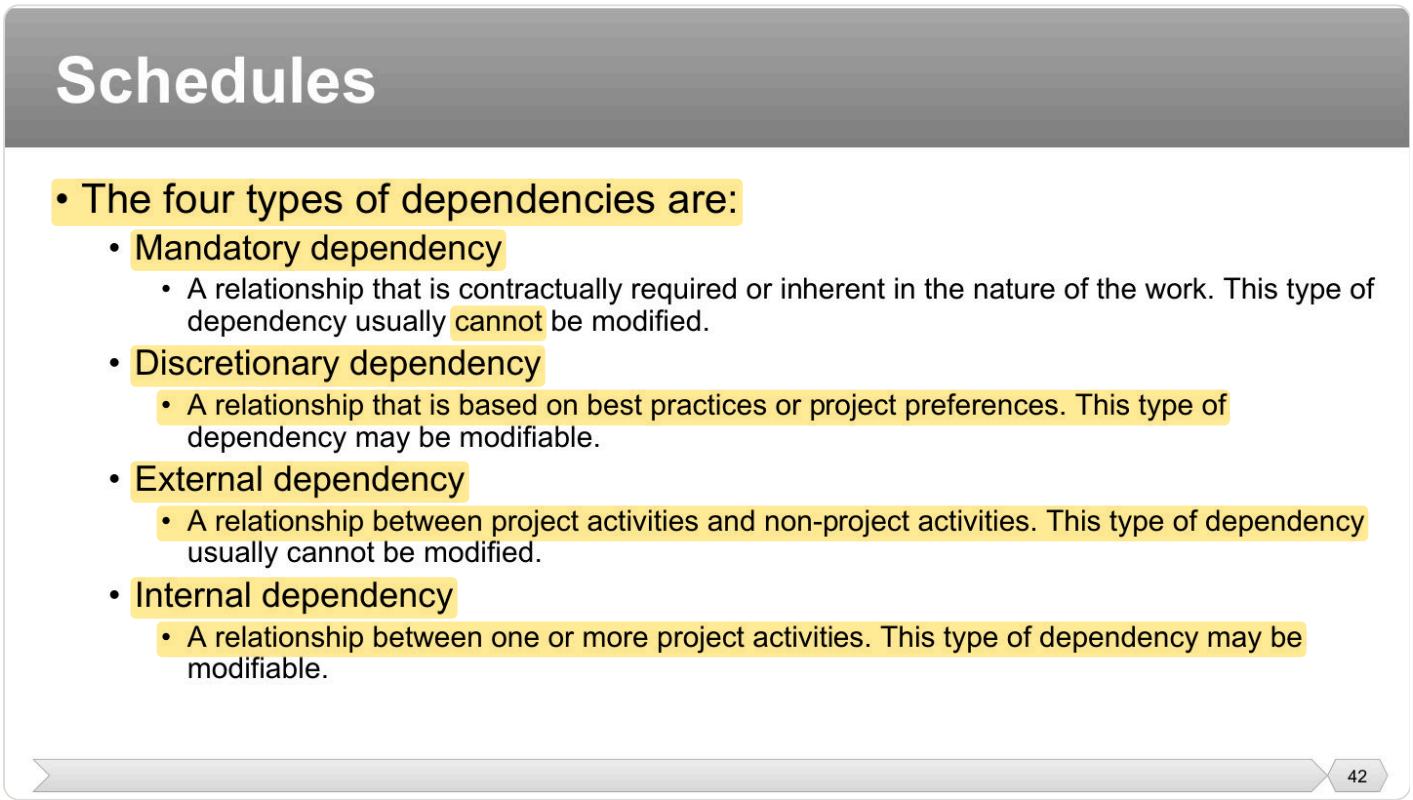
EXAM ANGLE

Past exam · Final 242 · Q2.1 Q1

As the project manager, you must ensure that the 12-month development timeline is realistic and achievable. Identify three project scheduling methods/techniques you would use to plan the sequence and timing of tasks. Briefly explain how each method helps in identifying delays or managing overlapping activities.

Answer: 1) Network diagram + Critical Path Method: shows dependencies and the longest path; any delay on a zero-slack critical activity delays the whole project, while slack shows how much other tasks can slip. 2) Gantt chart: shows each task on a timeline, so overlapping activities, resource clashes and slipping bars (actual vs planned) are easy to spot. 3) PERT: uses optimistic, most-likely and pessimistic durations ((O + 4M + P) / 6), useful for uncertain design, prototyping and regulatory work, so likely delays are built in. Chapter 6.2 covers these techniques.

SLIDE 42 / 107 **Schedules**



NOTES

1. A contract or physical reality forces this order, as you can't test code before it's written. **Mandatory** is what you check first when trying to shorten a schedule, because this kind **cannot** be rearranged.
2. This is the team's choice, like "finish the design review before coding". It's a good habit but not a law, so **discretionary** links are what you relax when fast-tracking. Doing so adds risk.
3. You're waiting on someone outside the project, like a government permit or a vendor's delivery. **External** links are out of your control, so all you can do is plan around them and monitor them.
4. Both activities belong to your project, such as "finish the API before the app connects to it". Since it's all in the team's hands, an **internal** link can often be reorganized.

TIPS & TRICKS

- **DIME**: Discretionary, Internal, Mandatory, External.

EXAM ANGLE

Prediction Q1

Waiting for a government permit before construction can begin is which type of dependency?

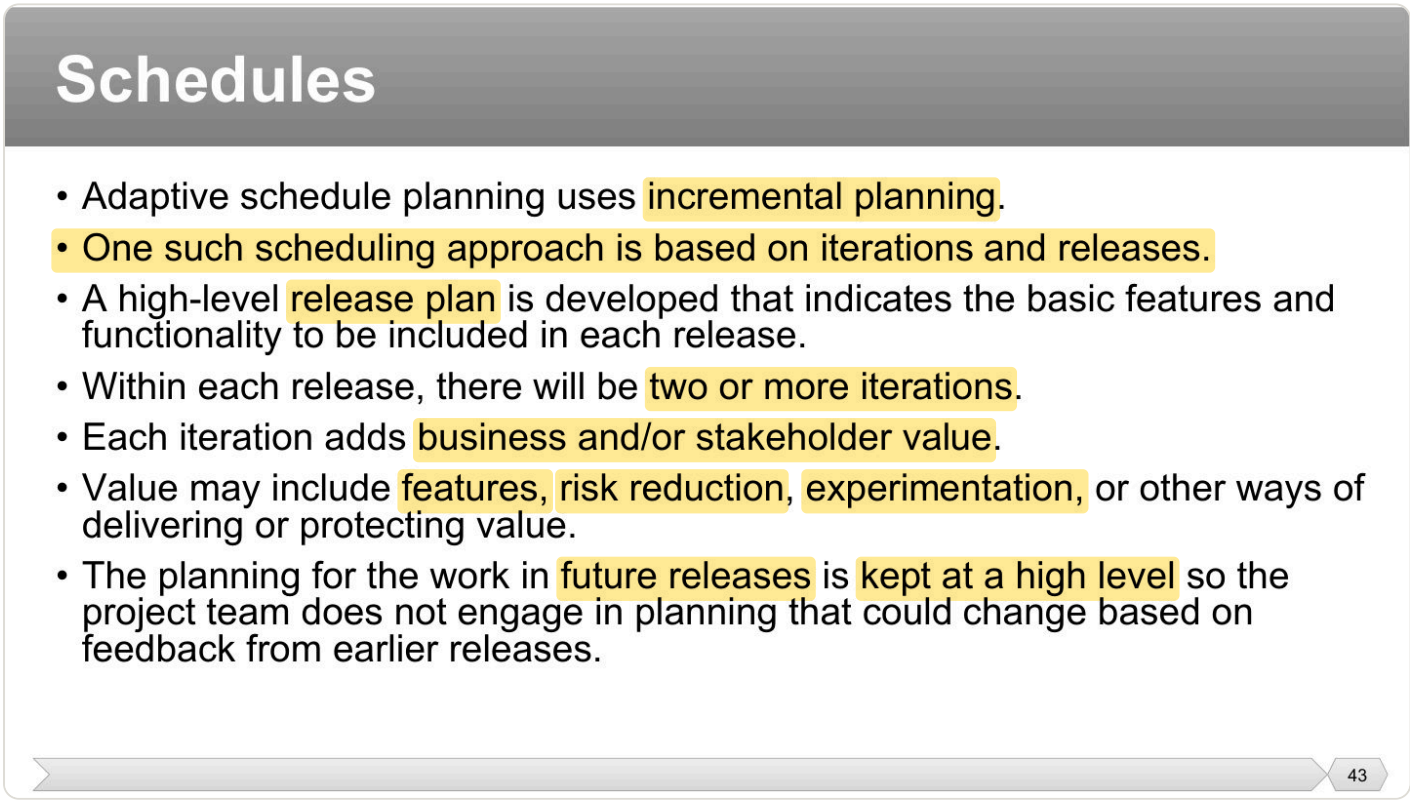
A **External**

B Discretionary

C Neither, it is a constraint

D Internal

SLIDE 43 / 107 **Schedules**



NOTES

1. Instead of scheduling every task for a year, you plan in layers: rough for later, detailed for soon. **Incremental planning** avoids carefully scheduling work that will have changed by the time you reach it.

2. A **release plan** is a commitment about what customers will get and roughly when, like “Release 1: login and profiles”. It gives stakeholders something to plan around without detailing every task.

3. Iterations break a release into short steps, so there's a working check on progress every few weeks, well before the release date. Each is a chance to correct course.

4. Value doesn't just mean new features. An iteration spent proving a risky technology works, or running an experiment, protects the project. So **risk reduction** counts too, even with nothing new on the screen.

5. Detailed plans for next year are wasted effort, as feedback from this release will change them. Keeping **future releases** high level saves that work and keeps the team free to act on what it learns.

EXAM ANGLE

Prediction Q1

Why are future releases kept high level in adaptive schedule planning?

A Contracts forbid planning them

> Contracts aren't the reason.

B Feedback from earlier releases will change them

> Detailing them now would waste the effort.

C Adaptive teams never plan

> They plan in layers.

D They don't matter to stakeholders

> They matter, but they aren't detailed yet.

Prediction Q2

In adaptive planning, each iteration must add a new visible feature to count as value.

T True

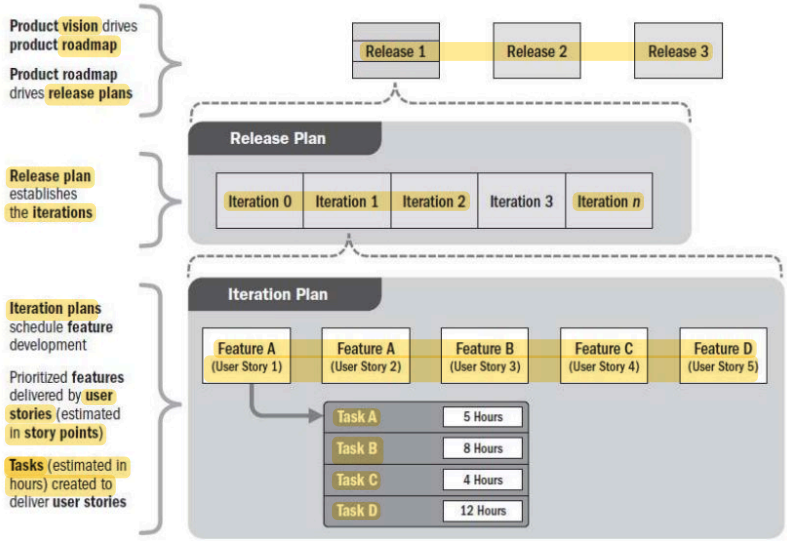
> The slide lists risk reduction and experiments as value too.

F False

> Value can also include risk reduction and experimentation.

Release and Iteration Plan

Schedules (Release and Iteration Plan)



NOTES

1. Reading the diagram as zoom levels: the product **vision** drives the roadmap, the **roadmap** drives the release plans (Releases 1–3), and each **release plan** sets its iterations (0…n).
2. Stories are broken into **tasks** estimated in hours (Task A 5 h, B 8 h…), the most detailed level, planned only for the current iteration.

EXAM ANGLE

Prediction

Q1

Which is the most detailed level in the release and iteration plan diagram?

A Tasks estimated in hours

> Stories get broken into tasks for the current iteration.

B Product vision

> The vision is the broadest level.

C Release plan

> That's above iterations and stories.

D Roadmap

> The roadmap sits above release plans.

 Schedules

Schedules

- Adaptive approaches often use timeboxes.
- The work in each timebox is based on a prioritized backlog.
- The project team determines the amount of work they can do in each timebox, estimates the work, and self-manages to accomplish the work.
- At the end of the timebox, the project team demonstrates the work completed.
- At that point, the backlog and estimates of work available to be done may be updated or reprioritized for the next timebox.

NOTES

1. A **timebox** flips the usual approach. Normally scope is fixed and time slips. Here time is fixed and scope flexes, so whatever's finished at the end is delivered. A sprint is the common example.
2. A **prioritized backlog** ensures the team takes the most valuable items first. If something doesn't fit, it's the least important thing that waits.
3. People doing the work know best how long it takes, and they commit more firmly to their own estimates. **Self-managing** also saves everyone from waiting for instructions.
4. A **demonstration** makes progress impossible to fake. "90% done" can mean anything, while working software in front of stakeholders can't, and they often spot misunderstandings right away.
5. This is where learning turns into action: what stakeholders just saw can change what's most valuable next. **Reprioritizing** every timebox is why this approach handles change well.

EXAM ANGLE

Prediction Q1

What stays fixed in a timebox?

A The team’s estimates for the whole project

> Estimates can be updated after each timebox.

B The list of backlog items forever

> The backlog gets updated and reprioritized.

C **The time**

> Time is fixed and scope flexes.

D The scope

> Scope is what flexes when work doesn’t fit.

Prediction Q2

What happens at the end of a timebox?

A The budget gets reset to zero

> Budget isn’t mentioned here.

B The project closes

> Only the timebox ends.

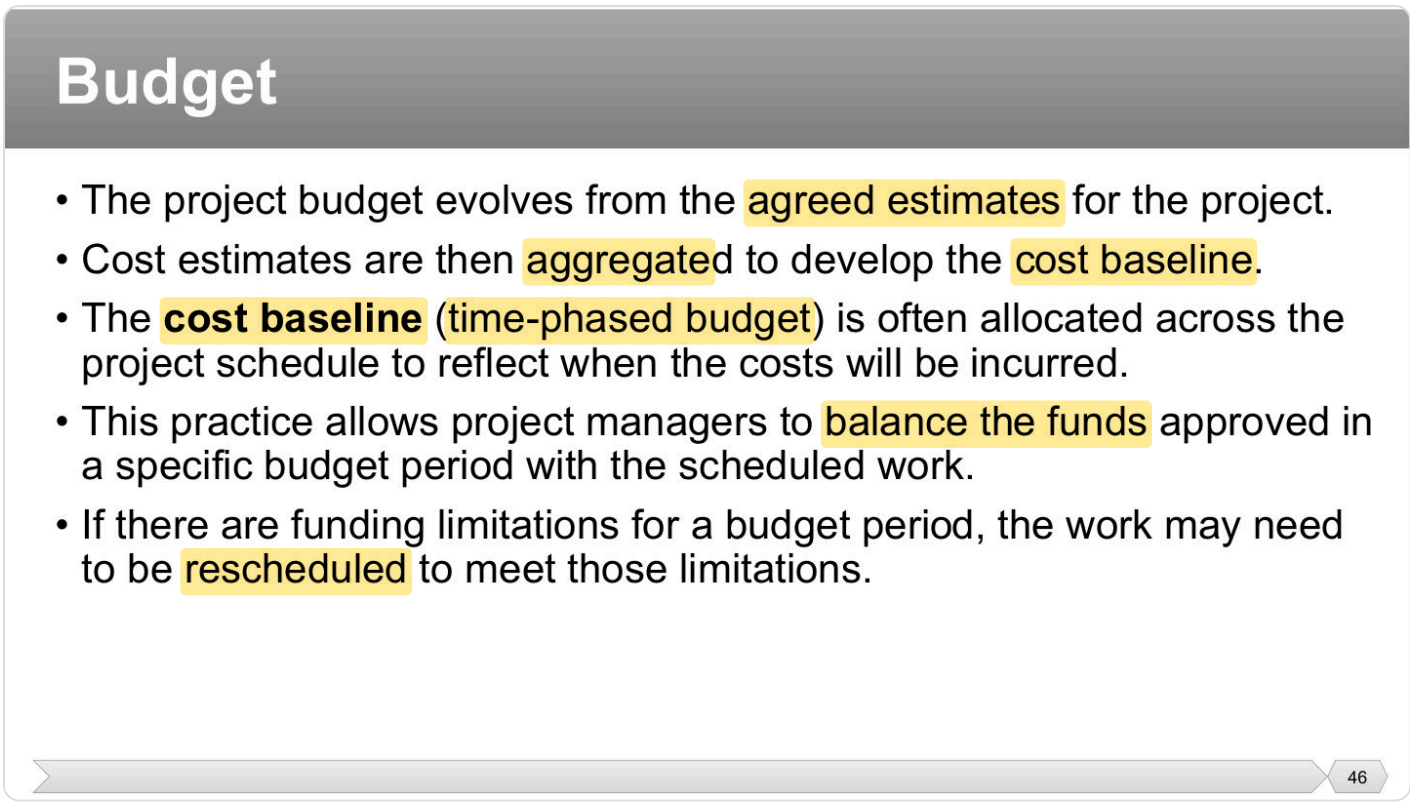
C **The team demonstrates completed work, and the backlog may be reprioritized**

> The slide describes both.

D The team starts a phase-gate audit

> That’s not what the slide describes.

 Budget



NOTES

1. A **budget** isn't an arbitrary figure handed down. It starts from what the work is estimated to cost, and it has to be agreed on, because those people will be held to it.
2. **Aggregate** just means adding up. Task costs roll up into work packages and then the whole project, and the total becomes the **cost baseline** you measure against.
3. Knowing the total isn't enough, because you also need to know when the cash is needed. **Time-phased** means spread across the schedule: little in month one, then a big spike when equipment is purchased.
4. Finance often releases money by quarter or year. **Balancing the funds** means checking that the work you've scheduled for a period doesn't cost more than that period's approved money.
5. If only $50K is available in Q1 but the plan needs $80K there, something has to move. **Rescheduling** shifts work to Q2, which may delay the project. That's why funding limits affect the schedule as well as the money.

EXAM ANGLE

Prediction Q1

What is a time-phased budget?

A A budget with no reserves

> Reserves are a separate matter.

B A list of risk responses

> That's a risk document.

C A single total with no dates

> Time-phased specifically includes when.

D A cost baseline spread across the schedule, showing when costs occur

> Time-phased means allocated over time.

Prediction Q2

Only $50K is available this quarter, but scheduled work costs $80K. What does the slide say may happen?

A The extra $30K is automatically approved

> Approval isn't automatic.

B Quality is always cut

> The slide's response is rescheduling.

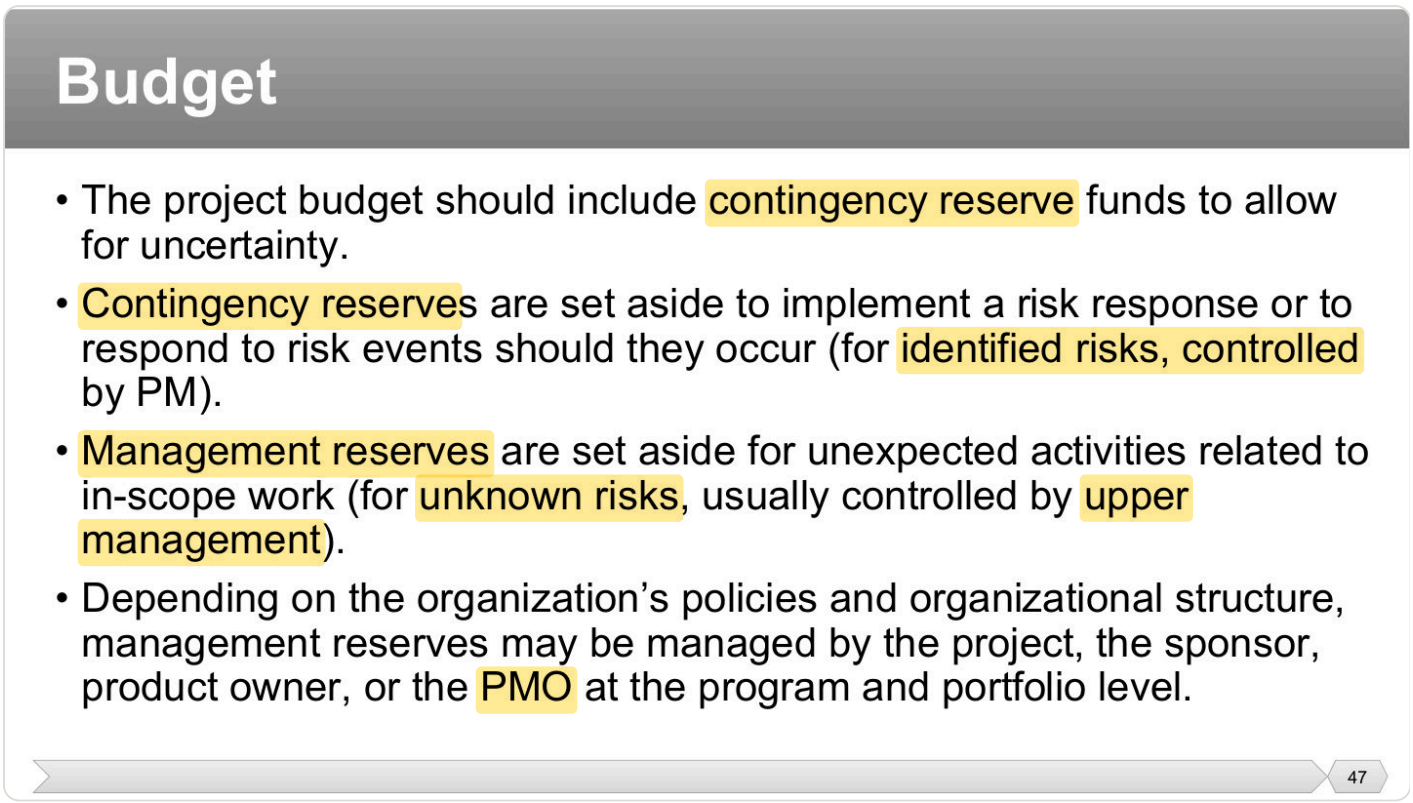
C The work may need to be rescheduled

> Funding limits can force changes to the schedule.

D The cost baseline is deleted

> Nothing here removes the baseline.

 Budget



NOTES

1. Every project has things that can go wrong and cost money. A budget with no **contingency reserve** assumes nothing will, which isn't realistic, and the first surprise puts you over budget.
2. You know this risk exists, you just don't know whether it will happen, like a key supplier being late. Because it's identified, the **PM** can use this money without going up the chain. Think "known unknowns".
3. This is for things nobody saw coming, like a sudden new regulation. Since it can't be tied to a planned risk, **upper management** controls it, and the PM has to ask for it. Think "unknown unknowns".
4. Who holds the money depends on how much control the organization wants, so the **PMO** or sponsor may hold it. What counts for exams is that it sits outside the PM's normal control.

EXAM ANGLE

Prediction Q1

A reserve for unknown, unplanned in-scope work, usually controlled by upper management, is the:

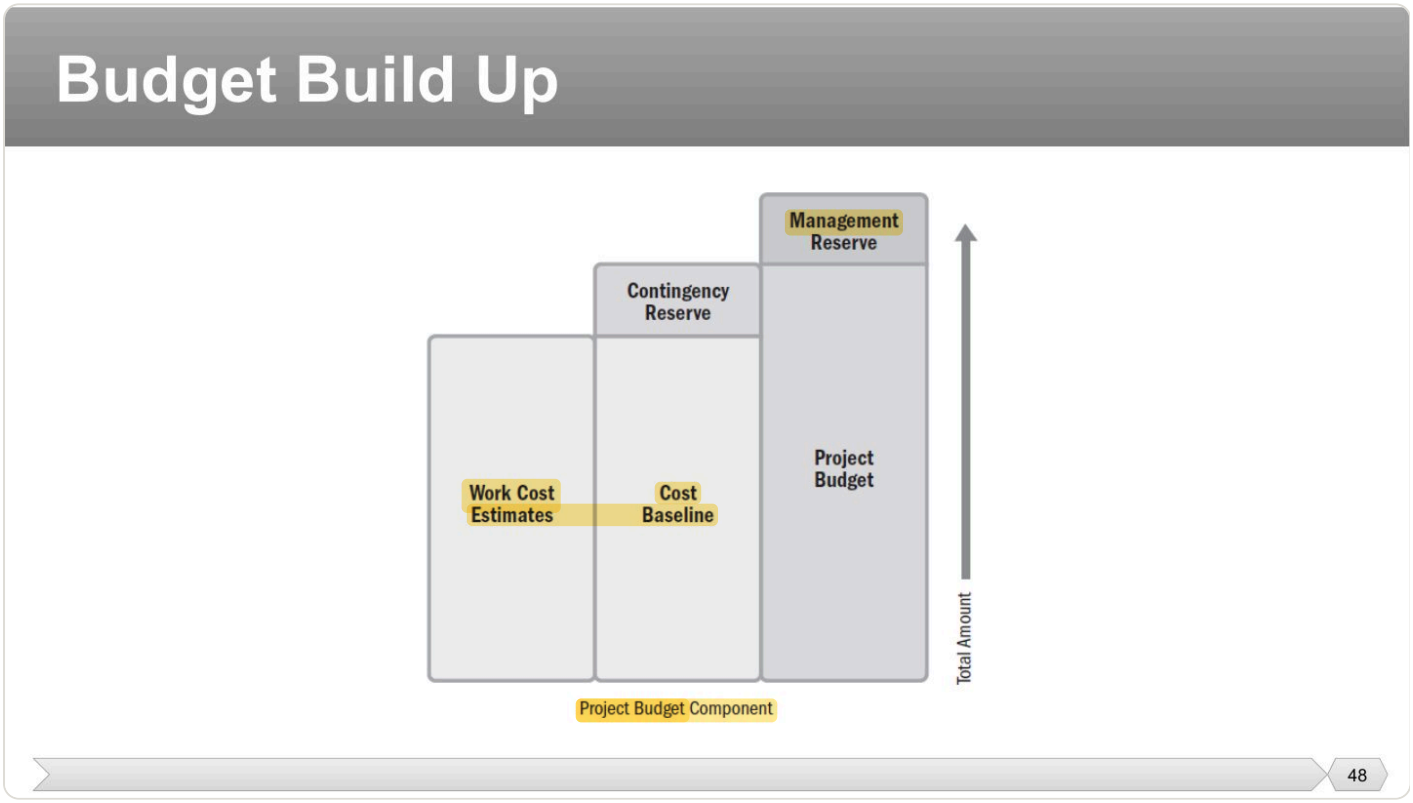
A **Management reserve**

B Work package budget

C Contingency reserve

D Cost baseline

SLIDE 48 / 107 **Budget Build Up**



NOTES

1. Build the budget bottom-up: **work cost estimates** come first.
2. Add the **contingency reserve** → the **cost baseline** (what the PM manages against).
3. Add the **management reserve** → the total **project budget**. So contingency is inside the baseline; management reserve is outside it.

EXAM ANGLE

Prediction Q1

Which amount is included in the cost baseline but not in the management reserve?

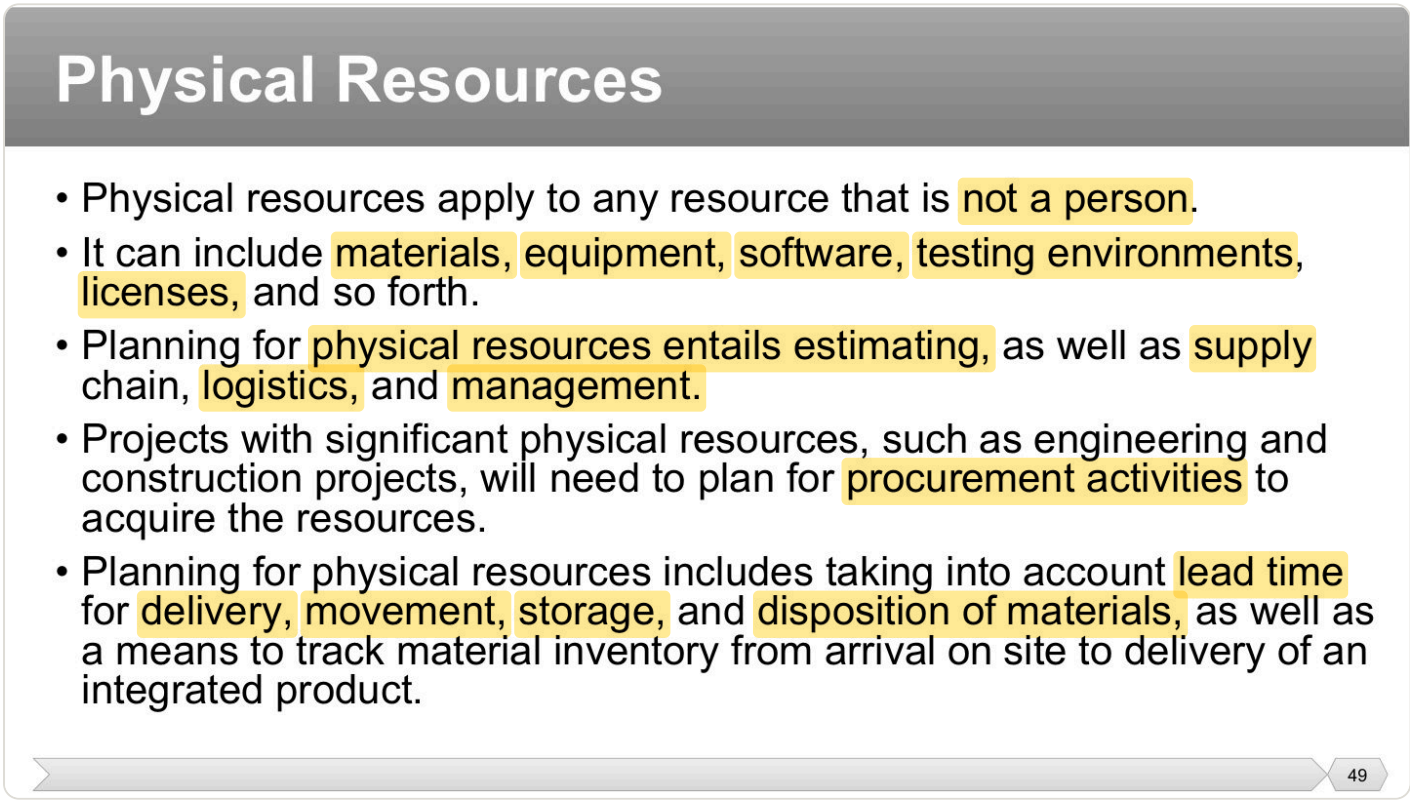
A Neither reserve

B **Contingency reserve**

C Management reserve

D Both reserves

SLIDE 49 / 107 **Physical Resources**



NOTES

1. If it isn't a person but the project needs it, count it here. **Not a person** covers more than you'd guess, including things you can't touch.
2. Software teams often forget this applies to them. **Testing environments** and licenses cost money and take time to set up, and running out of them can stop work just as a missing machine would.
3. For physical items, knowing how many isn't enough. **Supply chain** and logistics ask how they get here, who delivers them and where they're stored, since a late shipment stops everyone waiting on it.

4. If you need steel or cranes, you must buy or rent them, and that takes contracts and time. So **procurement** becomes a major part of planning on such projects.

5. **Lead time** is the wait between ordering and receiving. If equipment takes 12 weeks, ordering late delays everything. Storage and disposal matter too, because materials need somewhere to go.

EXAM ANGLE

Prediction Q1

Which counts as a physical resource?

- **A** **A software license**

  Physical resources are any resource that isn't a person, even software and licenses.

- **B** A senior developer

  A person isn't a physical resource.

- **C** A project sponsor

  A person isn't a physical resource.

- **D** A team norm

  A norm isn't a resource at all.

Prediction Q2

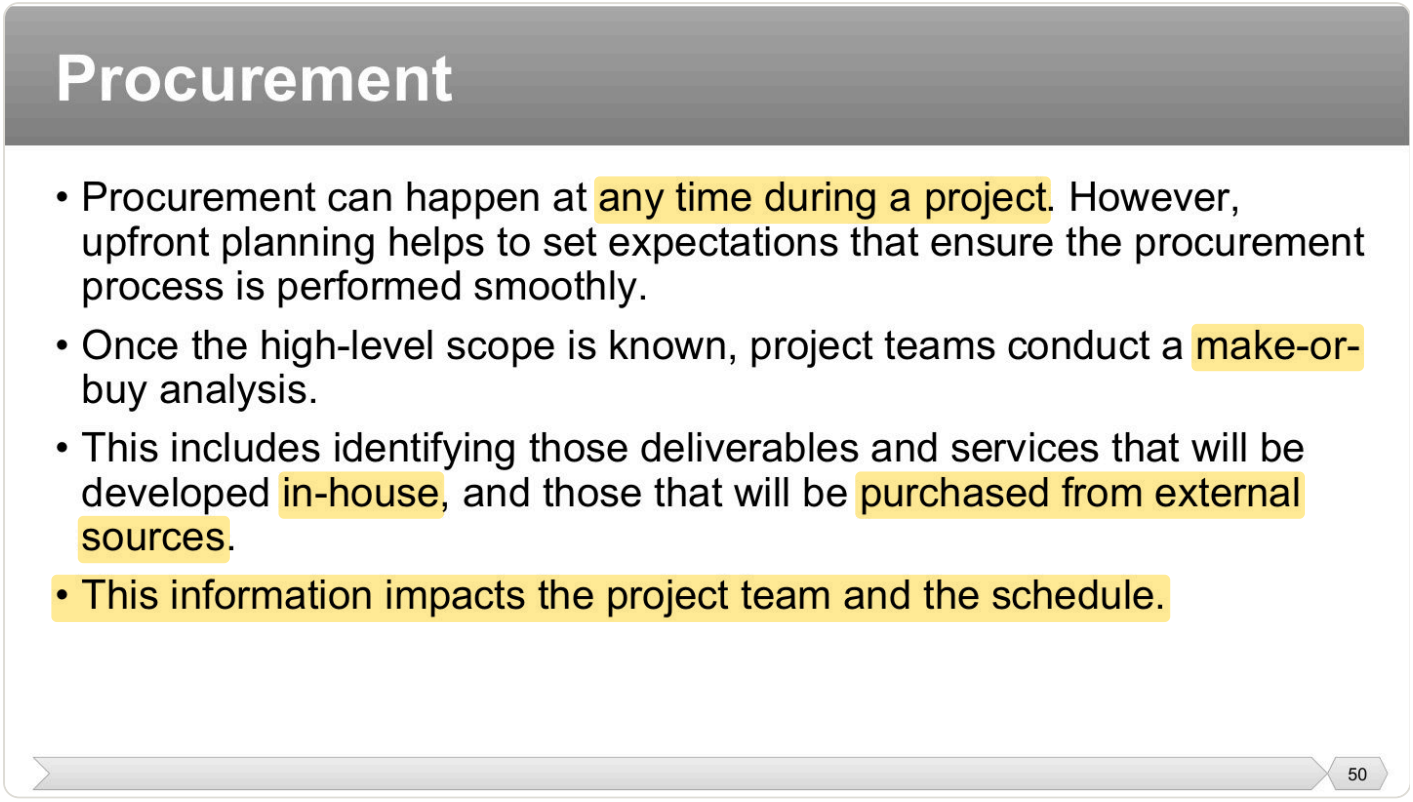
Planning for physical resources includes lead time for delivery.

- **T** **True**

  It covers lead time, movement, storage and disposal.

- **F** False

  The slide lists lead time.



NOTES

1. You can buy things at any point, but contracts take time and involve legal rules, so a late start can hold everyone up. Thinking ahead about **procurement** avoids surprises.
2. You need to know roughly what you're building before you can decide which parts to buy. So the **make-or-buy analysis** starts once the high-level scope is clear, and before detailed planning.
3. Do we build the login system or buy one? Building needs people and time, while buying needs money and a contract. So this choice changes who is on the team and how long things take, which is why it affects the schedule.

EXAM ANGLE

Prediction Q1

Deciding which deliverables to develop in-house and which to purchase is called:

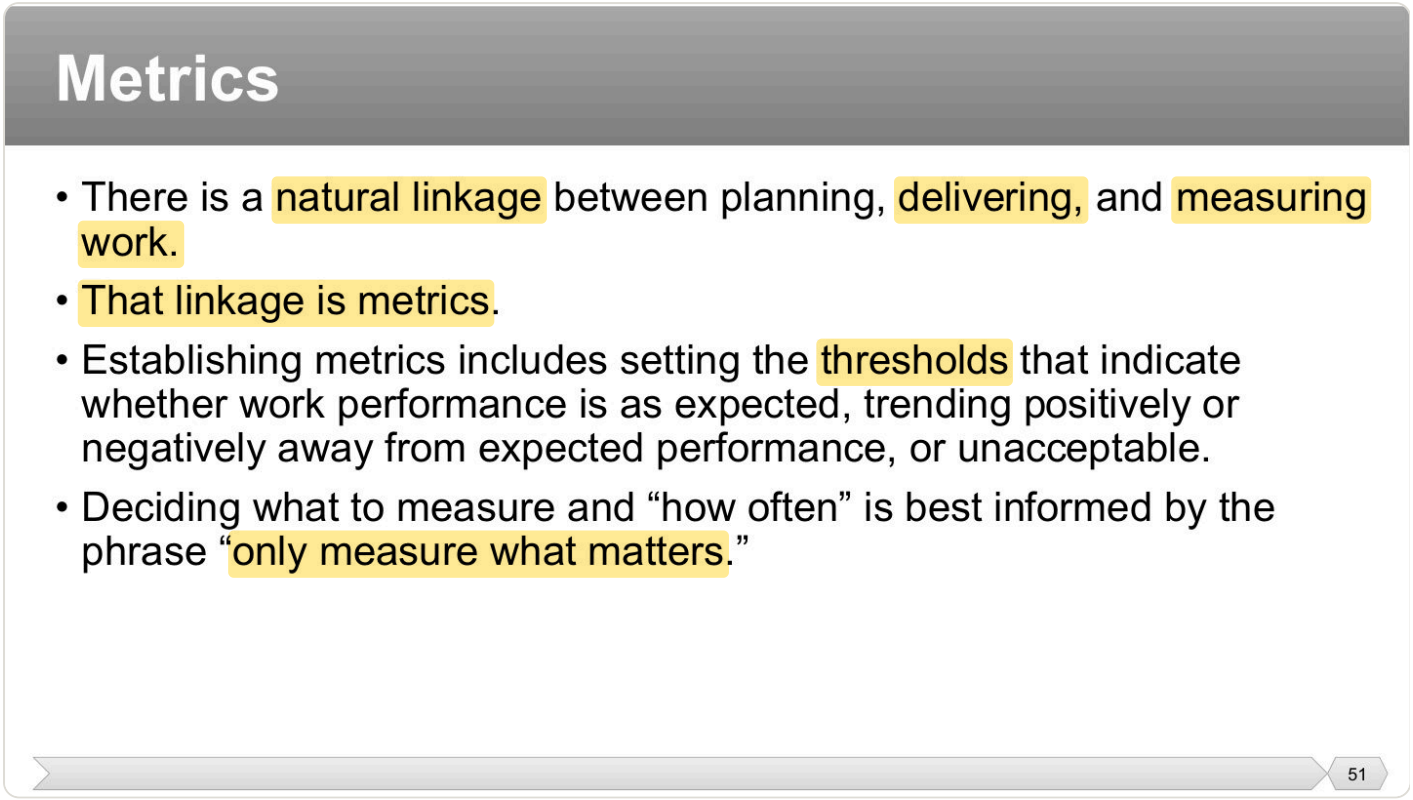
A A phase gate

B A bidder conference

C **Make-or-buy analysis**

D Resource leveling

 Metrics



NOTES

1. Plans say what should happen, delivery is what did happen, and measurement compares the two. Without that comparison, you can't tell if you're on track until it's too late.
2. **Metrics** are the connection: the same measure you plan with (say, 20 items per sprint) is what you check during delivery.
3. A number alone doesn't tell you whether to act. **Thresholds** give it meaning: agreeing in advance that "5% over budget is a warning, 10% is unacceptable" means nobody argues later about whether there's a problem.
4. Measuring takes time away from doing the work. **"Only measure what matters"** means that if a number wouldn't change any decision, you should stop collecting it.

EXAM ANGLE

Prediction Q1

Why does a team set thresholds when establishing metrics?

A To replace the schedule

> Thresholds don’t replace a schedule.

B To avoid talking about performance

> They help start that conversation.

C **To show whether performance is as expected, trending away, or unacceptable**

> A threshold gives the number meaning.

D To collect as much data as possible

> The rule is to measure only what matters.

Prediction Q2

A team asks what it should measure. Which phrase should guide it?

A Measure everything possible

> Measuring costs effort.

B Measure only cost

> Other things matter too.

C **Only measure what matters**

> This is the phrase the slide gives.

D Measure once at the end

> The slide links metrics to planning and delivering.

Checking Outcomes: Planning

Checking Outcomes—Planning Performance Domain

Outcome	Check
The project progresses in an organized, coordinated, and deliberate manner.	A performance review of project results against the project baselines and other measurement metrics demonstrates that the project is progressing as planned. Performance variances are within thresholds.
There is a holistic approach to delivering the project outcomes.	The delivery schedule, funding, resource availability, procurements, etc., demonstrate that the project is planned in a holistic manner with no gaps or areas of misalignment.
Evolving information is elaborated to produce the deliverables and outcomes for which the project was undertaken.	Initial information about deliverables and requirements compared to current information demonstrates appropriate elaboration. Current information compared to the business case indicates the project will produce the deliverables and outcomes it was undertaken to deliver.
Time spent planning is appropriate for the situation.	Project plans and documents demonstrate that the level of planning is appropriate for the project.
Planning information is sufficient to manage stakeholder expectations.	The communications management plan and stakeholder information indicate that the communications are sufficient to manage stakeholder expectations.
There is a process for the adaptation of plans throughout the project, based on emerging and changing needs or conditions.	Projects using a backlog show the adaptation of plans throughout the project. Projects using a change control process have change logs and documentation from change control board meetings that demonstrate the change control process is being applied.

NOTES

1. The “checking outcomes” table: the left column is what success looks like for the domain, the right column is the evidence that it happened. You won’t be asked to reproduce it, but it is a good structure for a written answer about the domain. Planning: the project progresses in an **organized** way (checked against baselines), a **holistic** approach (schedule, budget and resources integrated), plans **elaborated over time**, planning effort **appropriate** to the situation, and plans that **adapt**.

EXAM ANGLE

Prediction

Q1

Which evidence shows the project is progressing in an organized way?

A The number of pages in the plan

> Length doesn’t show organization.

B **Comparing performance with the baselines**

> The checking table uses baselines for this.

C Whether the sponsor attends meetings

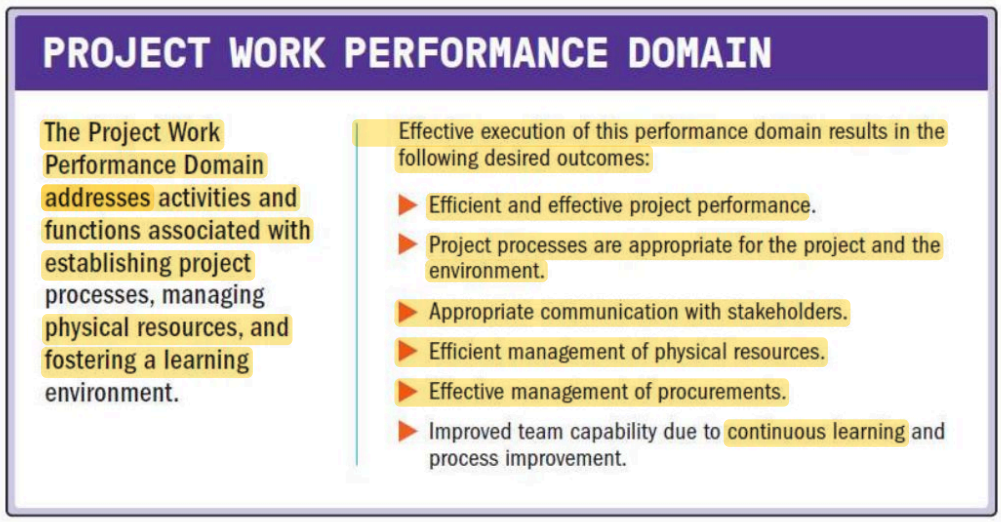
> That doesn’t measure this outcome.

D The team’s mood

> That’s about team health, not organization.

 Project Work Performance Domain

Project Work Performance Domain 5



EXAM ANGLE

Prediction Q1

Which belongs to the Project Work domain?

A Fostering a learning environment

It covers processes, physical resources and learning.

B Selecting predictive or adaptive

That belongs to the development approach domain.

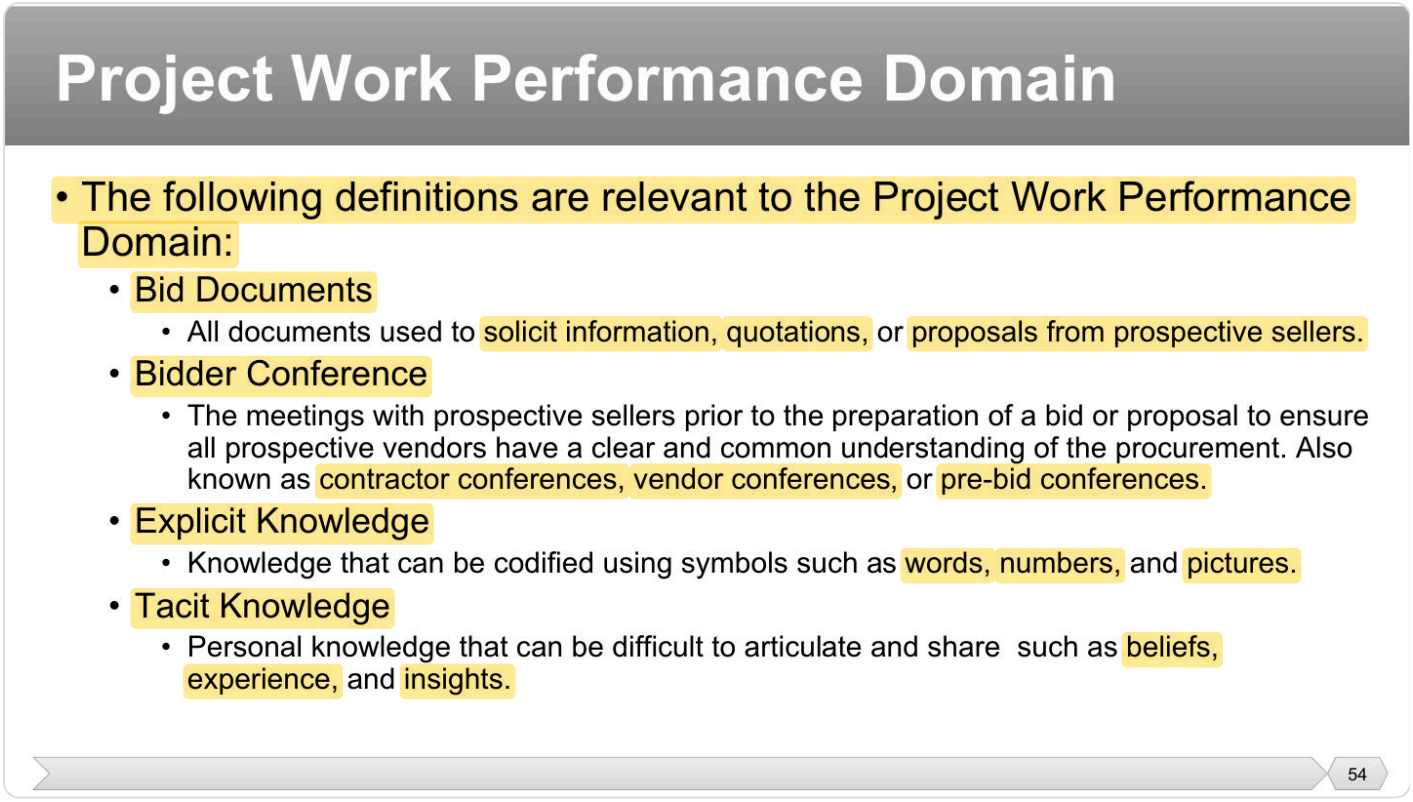
C Choosing leading indicators

That belongs to measurement.

D Setting the product's vision

That belongs to planning or product management.

 Project Work Performance Domain



NOTES

1. These are what a seller reads before replying. Clear **bid documents** mean offers you can compare fairly. Vague ones get you prices for different things.
2. If one vendor gets extra details, the process isn't fair and the bids can't be compared. A **bidder conference** gives every seller the same answers at the same time, before they write their offers.
3. If it can be written down and handed to someone, it's **explicit**, like a setup guide. It's easy to store and share, which also means it survives when people leave.
4. **Tacit knowledge**: personal and hard to articulate (beliefs, experience, insights), e.g. a senior developer's instinct for which module will break. It is shared through mentoring, pairing and conversation.

EXAM ANGLE

Prediction Q1

An experienced developer's instinct for which modules usually break under load is an example of:

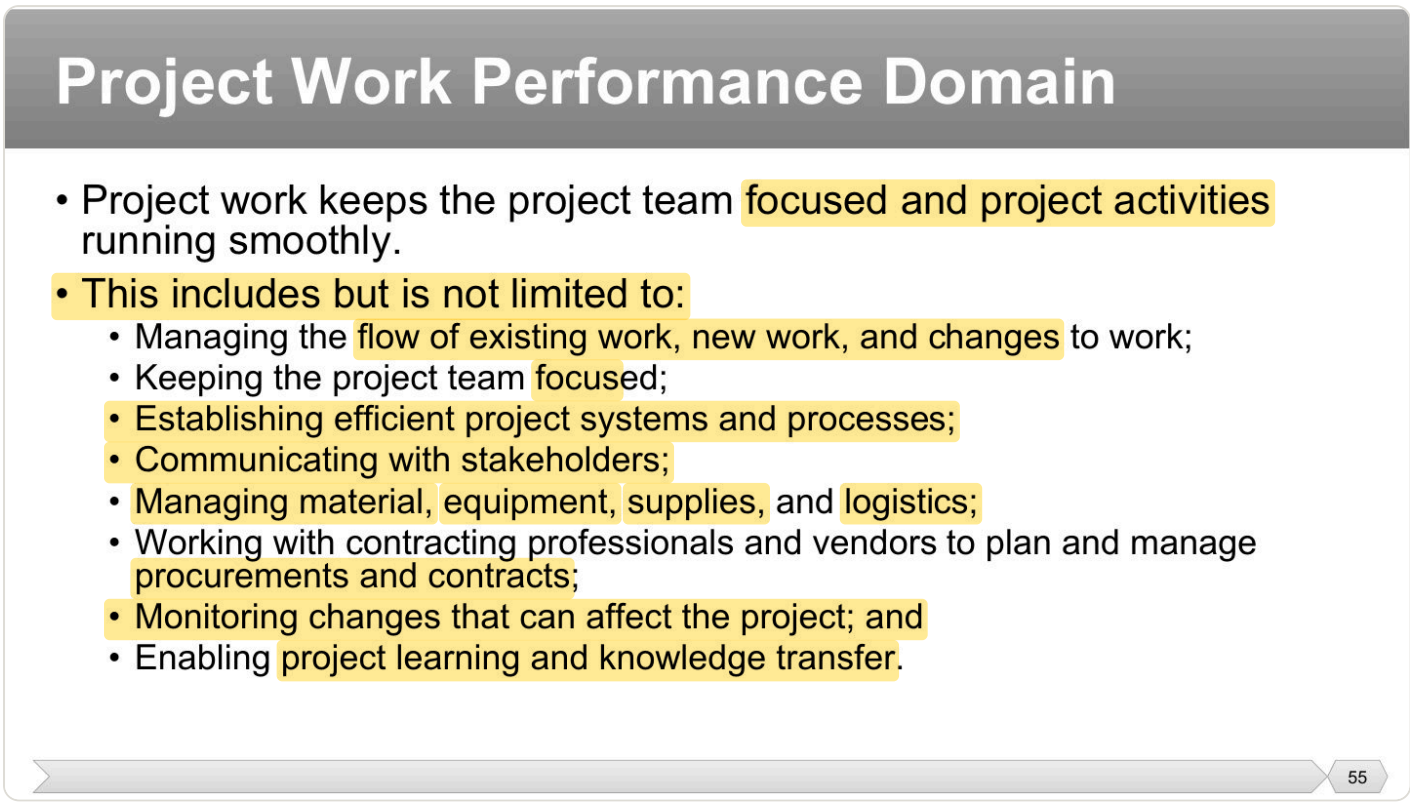
A Explicit knowledge

B A bid document

C **Tacit knowledge**

D A metric

 Project Work Performance Domain



NOTES

1. Between planning and delivery comes the daily running of a project. This domain is about keeping work moving and removing distractions so that people can **focus**.
2. New requests keep arriving during a project. Without somewhere to put them, people get pulled in every direction. Managing the **flow of work** means deciding what gets done now and what waits.
3. A missing part or a slow contract can stall work just as surely as a software bug. So **procurement** and logistics aren't side jobs here, and watching for changes means catching problems before they spread.
4. What one person learns is lost if it stays with them. **Knowledge transfer** means that when someone solves a hard problem or leaves, the team keeps what they learned.

EXAM ANGLE

Prediction Q1

Which activity is part of project work?

A Deciding the company's annual dividend

> That's outside the project.

B **Working with vendors to manage procurements and contracts**

> It's on the slide's list.

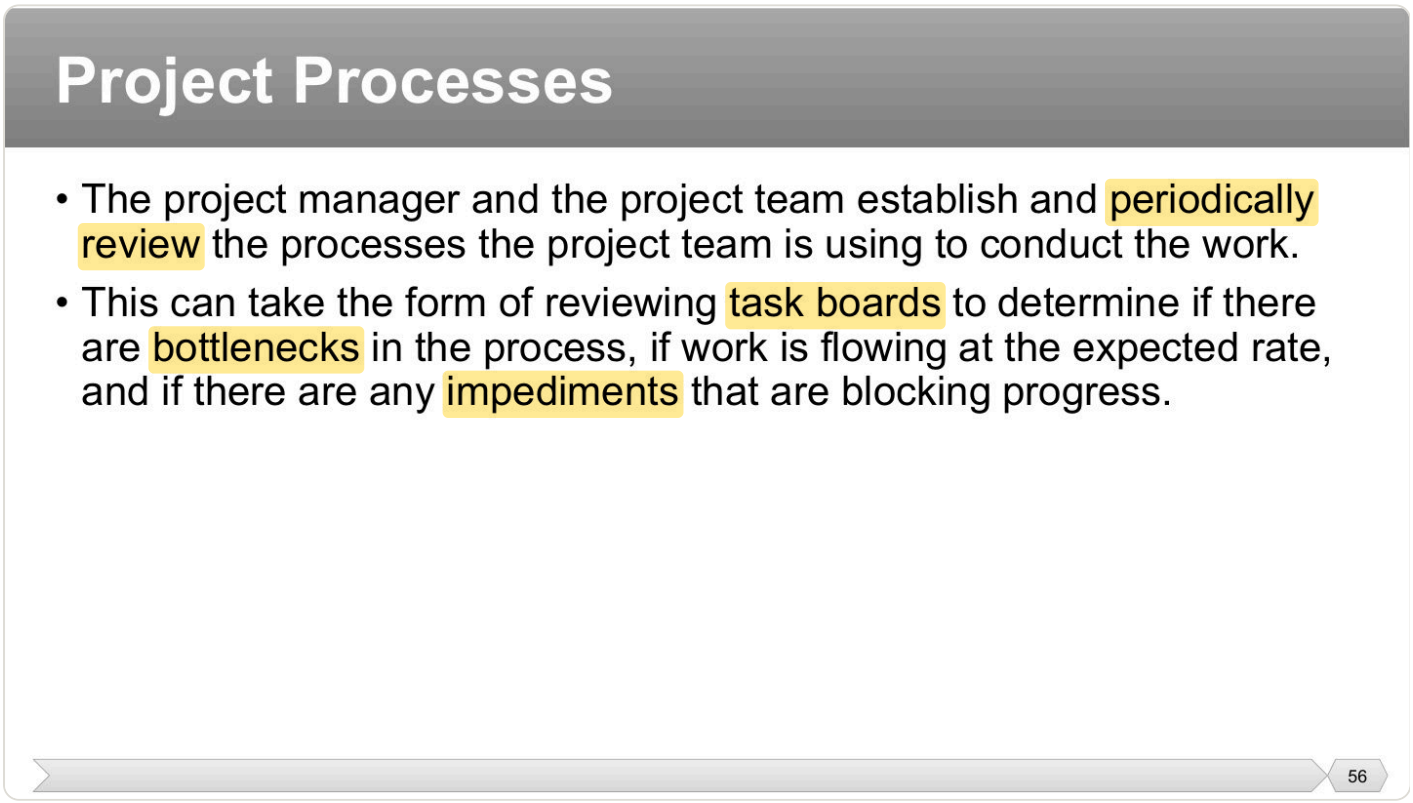
C Writing the organization's mission statement

> That's strategic management.

D Rewriting the PMI code of ethics

> That's outside the project.

SLIDE 56 / 107 **Project Processes**



NOTES

1 A process that worked in month one may not suit month six, once the team or the work has changed. That's why it isn't set once and forgotten: you **review** it **periodically**.

2 For example, review **task boards** for **bottlenecks** (work piling up in one column), whether work flows at the expected rate, and **impediments** blocking progress.

EXAM ANGLE

Prediction Q1

A review of the task board shows work piling up in one column. What has it found?

A A leading indicator of profit

> Nothing here measures profit.

B A deliverable

> A deliverable is an output, not a pile-up.

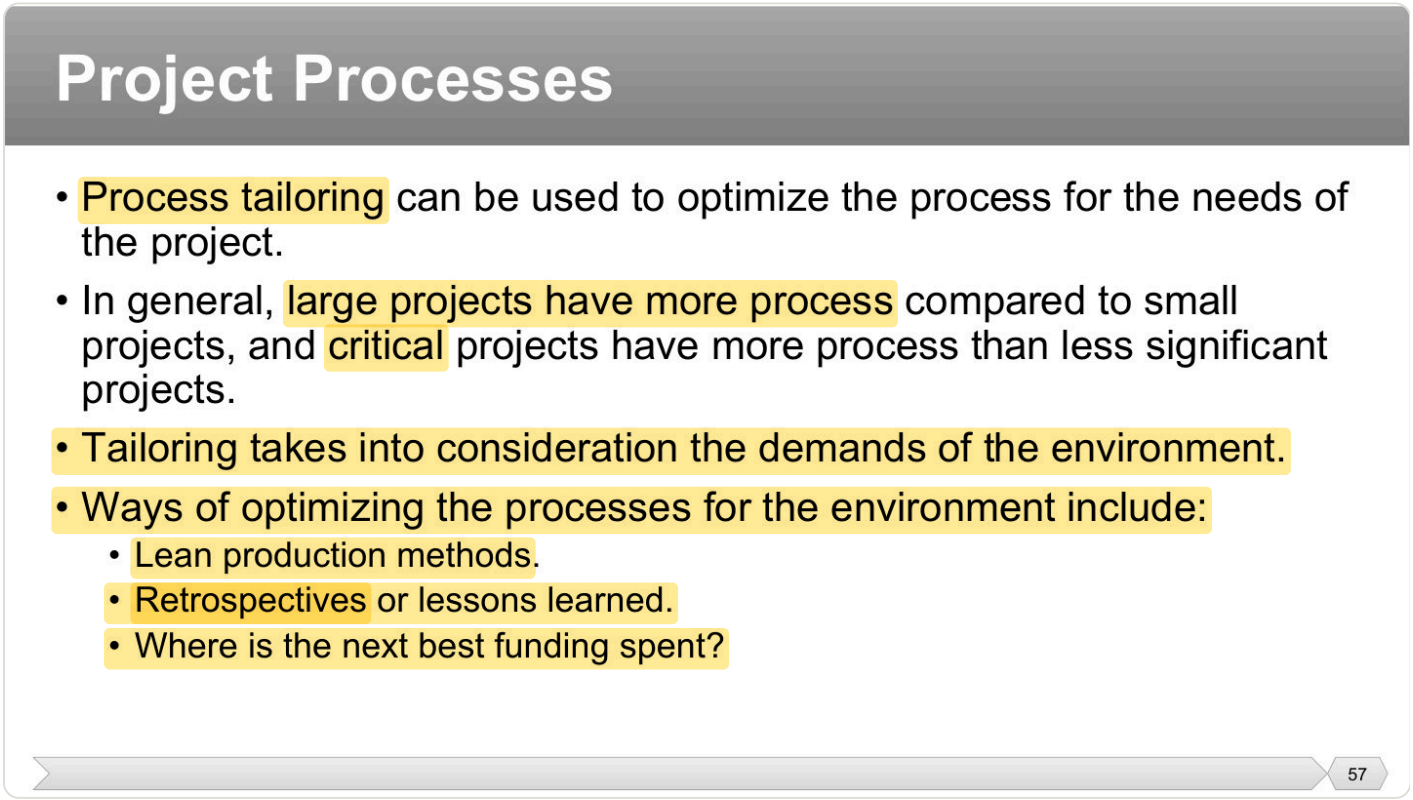
C **A bottleneck**

> That's what the slide tells you to look for.

D A baseline

> A baseline is an approved reference.

SLIDE 57 / 107 **Project Processes**



NOTES

1. A process should fit the project, not the other way around. **Process tailoring** means removing steps that add nothing here and adding ones this project needs.

2. Failure costs more on some projects. A medical device needs heavy documentation because errors can hurt people, while a small internal tool doesn't. So how **critical** a project is matters as much as its size.

3. These are all ways of asking "is this effort worth it?". **Lean** removes steps that add no value, **retrospectives** find what to change, and the funding question stops you polishing something that's already good enough.

EXAM ANGLE

Prediction Q1

Which project usually has the most process?

A A small, internal tool

> Small and less significant means less process.

B A small, low-importance project

> That has the least.

C Any project equally

> The slide says it varies.

D A large, critical project

> Large and critical projects have more process.

Prediction Q2

Which is a way of optimizing a process for its environment?

A Freezing the process forever

> Optimizing means changing it when needed.

B Removing all reviews

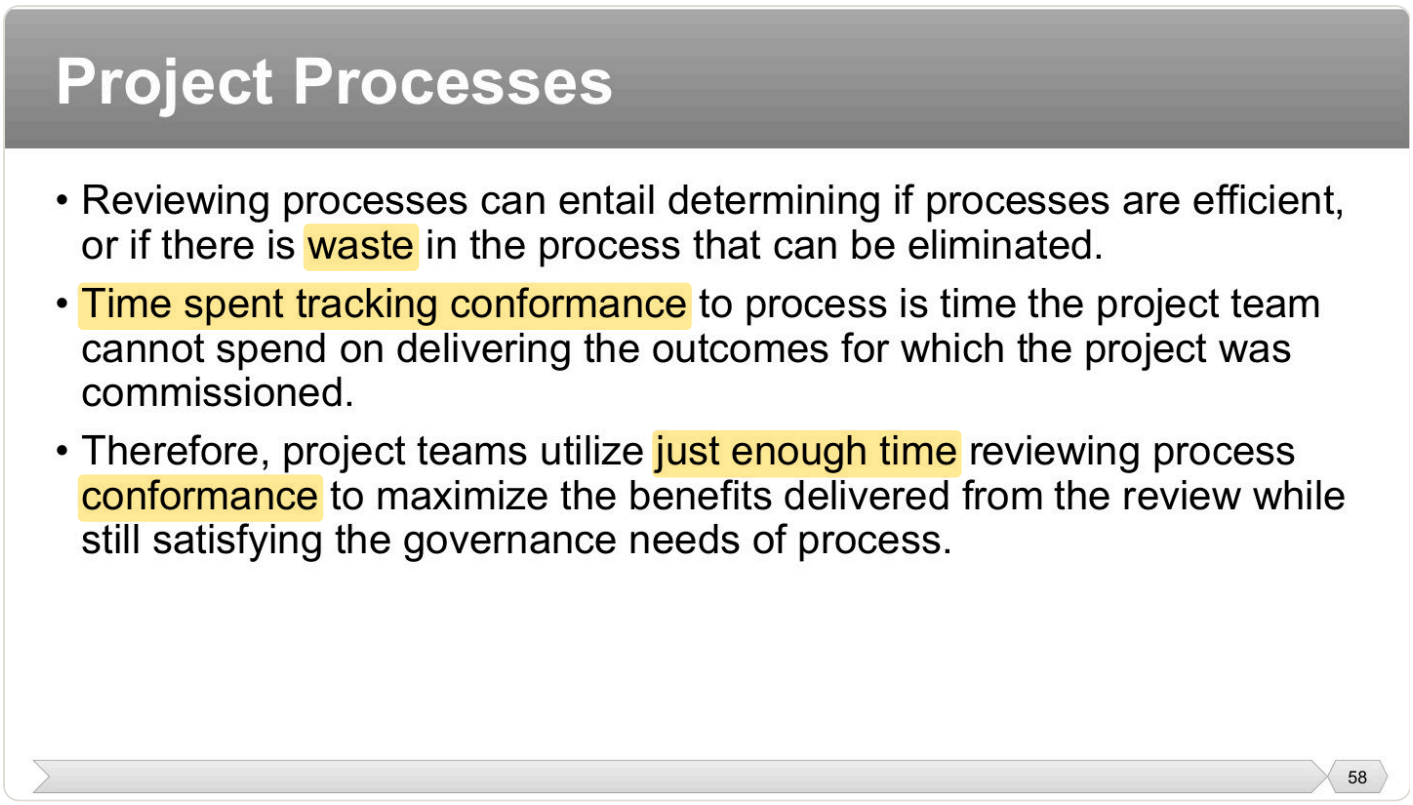
> That isn't optimizing, it's skipping.

C Adding approvals to every step

> That adds process without a reason.

D Retrospectives or lessons learned

> It's on the slide's list.



NOTES

1. **Waste** is any effort that adds no value, such as three approvals when one would do. Reviewing processes finds these, and it's often the cheapest way to speed up a project.

2. Every hour spent proving you followed the process is an hour not spent building. Checking **conformance** has a real cost, so more checking isn't automatically better.

3. Too little review and you drift out of compliance. Too much and nothing gets built. **Just enough** means the amount that gets the benefit and satisfies governance, which is the same idea as tailoring.

EXAM ANGLE

Prediction Q1

The more time a team spends checking process conformance, the better the project's outcome.

T True

> The slide warns against spending more than needed.

F False

> Time checking conformance is time not spent delivering, so teams use just enough.

Prediction Q2

What should process reviews try to eliminate?

A Governance needs

> Those still need satisfying.

B The outcomes

> Outcomes are what the project is for.

C All documentation

> Some of it is valuable.

D Waste

> Reviews look for inefficiency and waste.

Balancing Competing Constraints

Balancing Competing Constraints

- Successfully leading a project includes understanding the constraints associated with the work.
- Constraints can take the form of fixed delivery dates, compliance to regulatory codes, a predetermined budget, quality policies, and so forth. The constraints may shift and change throughout the project.
- A new stakeholder requirement may entail expanding the schedule and budget.
- A reduction in budget may entail relaxing a quality requirement or reducing scope.

NOTES

1. A **constraint** is a limit you can't simply wish away. You're working within them from the start, so a PM who doesn't know what's truly fixed can't make good trade-offs.
2. Knowing which of these is fixed tells you where you have room. If the launch date is set by law, then scope or budget must flex instead. A **fixed delivery date** and a **predetermined budget** are the usual examples.
3. A budget approved in January may be cut in June. So balancing **constraints** isn't a one-time decision, and you need to keep checking what's still fixed.
4. New work needs more time and money, unless something else is removed. A **new stakeholder requirement** is a good test of whether a PM can explain the cost of saying yes.
5. ...and a **budget cut** may relax a quality requirement or reduce scope. They are interrelated: change one, and the others move.

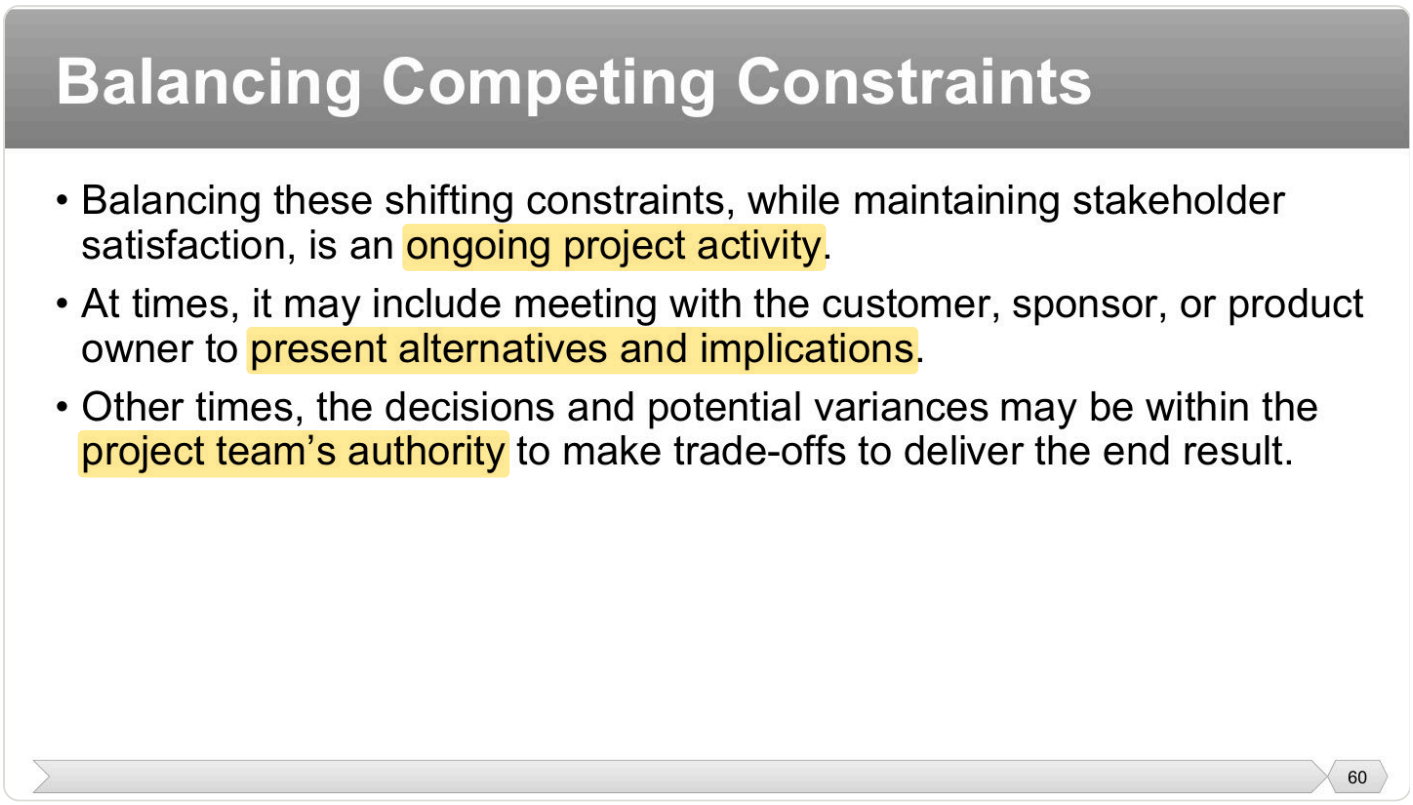
EXAM ANGLE

Past exam · Final 242 · Q1.1 — Q1

Define the term 'project constraints' and explain how they influence project planning and execution. Provide at least three examples of common constraints and discuss their interrelationship.

Answer: Project constraints are the limits a project must be delivered within. The classic three are scope, time and cost, often with quality, resources and risk. They drive planning because every schedule, budget and scope decision has to fit inside them, and during execution the PM keeps trading them off. They are interrelated (the triple constraint): cutting the schedule usually needs more cost or less scope, and adding scope needs more time or money; quality sits in the middle and suffers if they are squeezed.

 Balancing Competing Constraints



NOTES

1. Nothing stays balanced for long, since a new risk or a late supplier shifts things again. Balancing is **ongoing** work for the whole project, not a task done once in planning.
2. Don't just bring problems to the sponsor, bring choices. "We can cut feature X or slip two weeks; here's what each costs" lets them decide quickly. Presenting **alternatives and their implications** does that.
3. Not every trade-off needs a meeting with the sponsor. If it doesn't affect what was promised, like swapping two tasks, the **team's authority** covers it, and that keeps things moving.

EXAM ANGLE

Prediction Q1

A trade-off will change what the customer was promised. What should the PM do?

A Present alternatives and their implications to the customer, sponsor or product owner

> Big trade-offs go to them.

B Cancel the project

> That's far too extreme.

C Decide quietly and tell nobody

> They need to be told, as it affects what was promised.

D Ignore it until closing

> Balancing is ongoing.

Prediction Q2

Balancing constraints is done once, during planning.

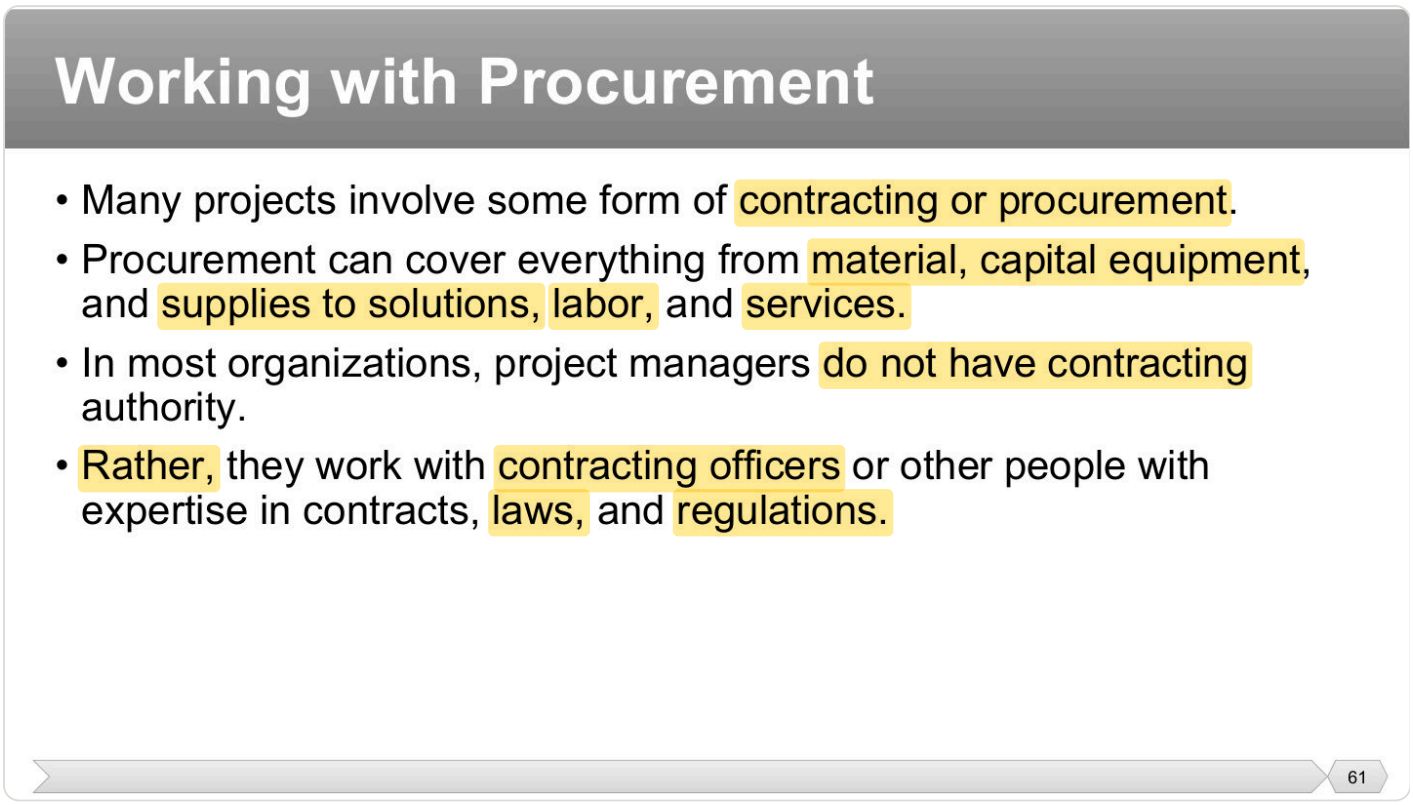
T True

> The slide calls it ongoing.

F False

> It is an ongoing activity, because constraints shift.

 Working with Procurement



NOTES

1. Few projects can do everything themselves. As soon as you buy, rent or hire from outside, legal commitments are involved, which is why **contracting** deserves its own attention.

2. Don't just picture buying machines: hiring a consultant or a software company is also procurement. **Materials, labor and services** are all covered by the same rules.

3. A contract legally binds the organization, so the right to sign one is tightly limited. A PM who agrees terms with a vendor informally can create real legal problems, because they have **no contracting authority**.

4. The PM knows what's needed, and the **contracting officer** knows the law. They rely on each other: one defines the work, and the other makes the agreement valid and safe.

EXAM ANGLE

Prediction

Q1

A vendor offers a great price. Can the PM sign the contract?

A Only after the project ends

> Timing isn't what's at issue.

B Usually not. PMs generally lack contracting authority and work with contracting officers

> That's what the slide says about most organizations.

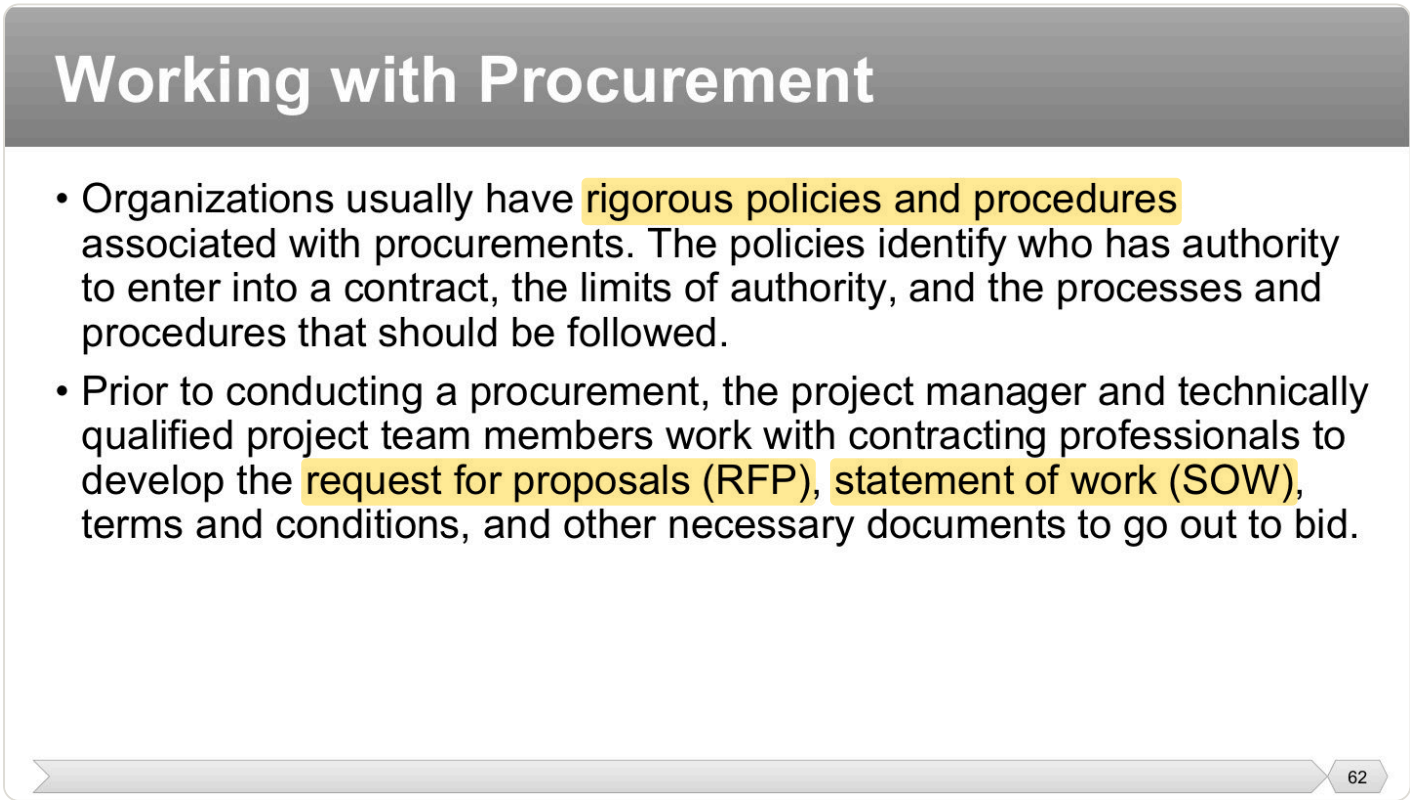
C Yes, always, as the project's leader

> Most PMs don't have this authority.

D Yes, if the team agrees

> A team vote doesn't grant legal authority.

SLIDE 62 / 107 **Working with Procurement**



NOTES

1 Spending the organization's money without controls invites fraud and legal disputes. **Rigorous procurement policies** spell out who may sign what, and up to what amount, so that no one is left guessing.

2 A lawyer can't judge whether a technical requirement is right, and an engineer can't judge a contract clause, so they write these together. The **SOW** matters most: if it's vague, you get arguments about what was promised.

EXAM ANGLE

Prediction Q1

What does a statement of work (SOW) describe?

A The work the seller must do

It's written before going to bid.

B The risks the team has accepted

That's in a risk register.

C The company's vision

That's a strategic statement.

D The team's internal norms

Norms are team agreements.

Prediction Q2

Who develops the RFP and other bid documents?

A Only external auditors

They aren't involved here.

B The PM and technical team members, with contracting professionals

Technical and contract knowledge are both needed.

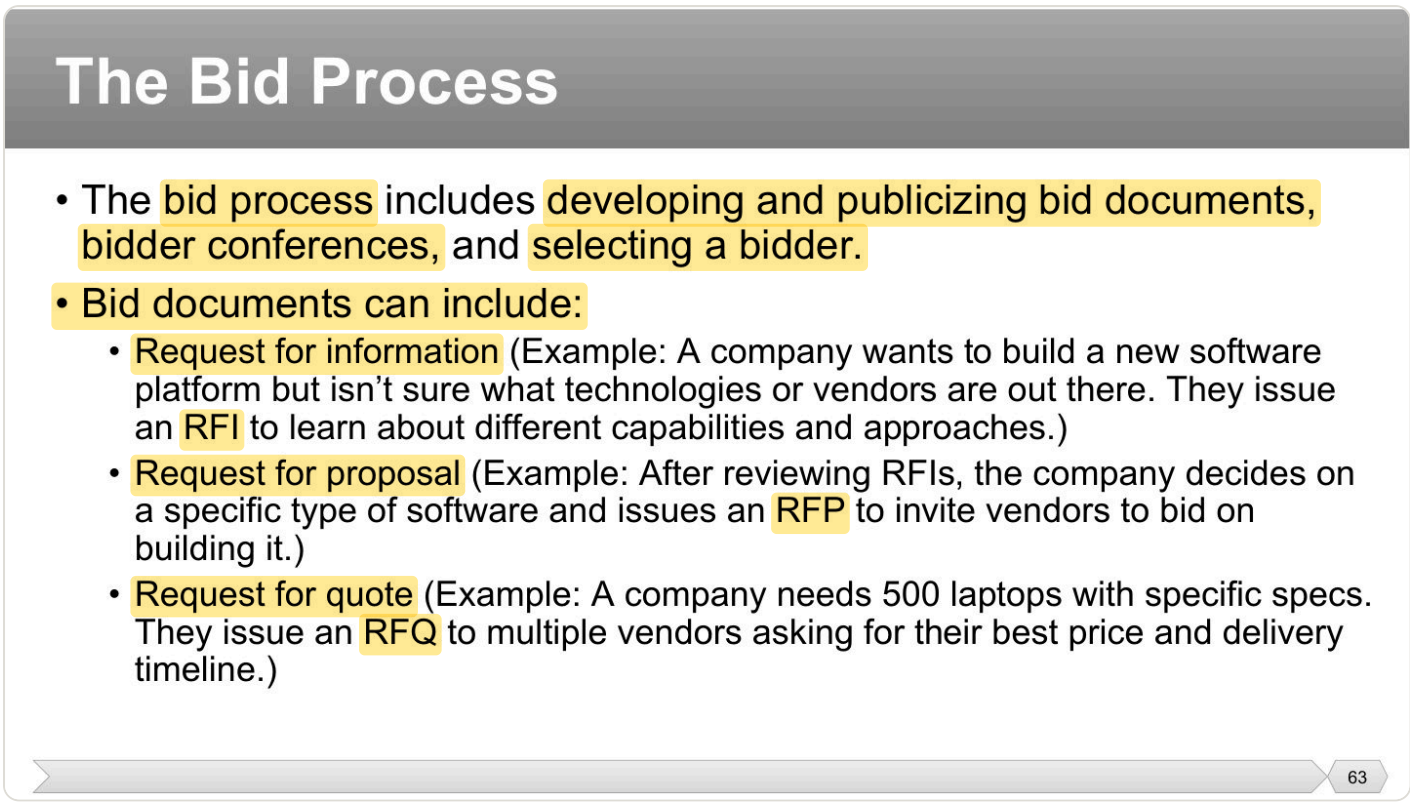
C Only the sponsor

The slide names a wider group.

D The vendor

The vendor responds to these documents.

 The Bid Process



NOTES

1. Sellers need a fair chance and buyers need comparable offers. So there's a fixed order: publish what you want, answer questions equally, then choose. Skipping steps invites disputes about the **bid process**.
2. Use an **RFI** when you don't yet know what's possible. You're researching rather than buying, so it commits you to nothing.
3. **RFP** (request for proposal): "how would you build it?", used once the type of solution is chosen, to invite vendors to propose and bid.
4. **RFQ** (request for quote): "what's your price?", used for a known, specified item (500 laptops with exact specs).

EXAM ANGLE

Prediction Q1

A company needs 500 laptops with exact specifications and asks several vendors for their best price and delivery time. Which bid document does it issue?

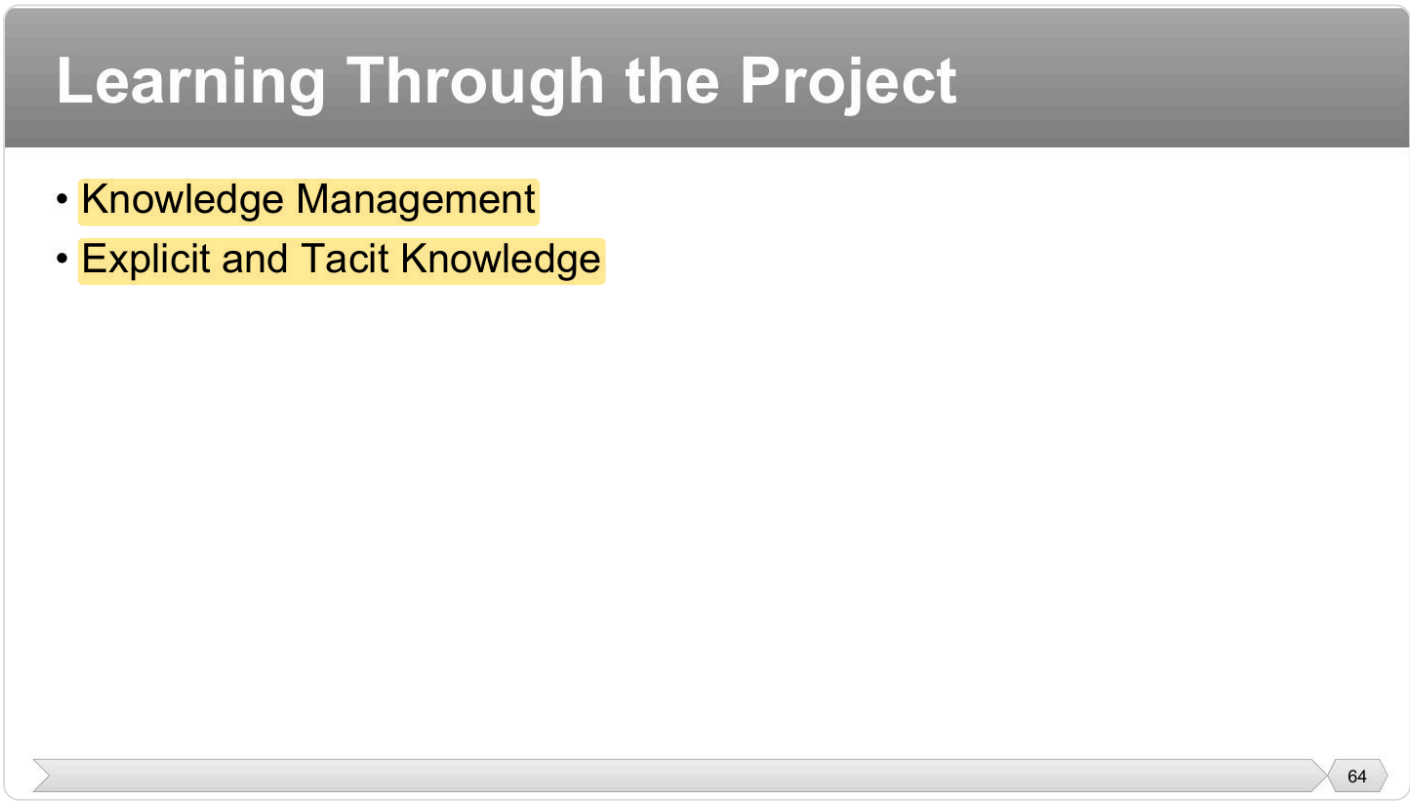
A Statement of work (SOW)

B **Request for quote (RFQ)**

C Request for information (RFI)

D Request for proposal (RFP)

SLIDE 64 / 107 **Learning Through the Project**



NOTES

1. Learning through the project is **knowledge management**: capturing and sharing what the team learns so it isn't lost when people leave.

2. It covers both **explicit** knowledge (documents, lessons-learned registers) and **tacit** knowledge (shared through mentoring, pairing, communities of practice). The diagram shows explicit knowledge flowing through information management and tacit knowledge through people.

EXAM ANGLE

Prediction

Q1

A senior developer's instinct for which module will break is shared through pairing. What kind of knowledge is this?

A Contractual

> That isn't one of the two kinds.

B Explicit

> Explicit knowledge can be written down easily.

C **Tacit**

> It's personal and hard to write down.

D Procurement

> That's a different subject.

SLIDE 65 / 107

Checking Outcomes: Project Work

Outcome	Check
Efficient and effective project performance	Status reports show that project work is efficient and effective.
Project processes that are appropriate for the project and the environment	Evidence shows that the project processes have been tailored to meet the needs of the project and the environment. Process audits and quality assurance activities show that the processes are relevant and being used effectively.
Appropriate communication and engagement with stakeholders	The project communications management plan and communication artifacts demonstrate that the planned communications are being delivered to stakeholders. There are few ad hoc requests for information or misunderstandings that might indicate engagement and communication activities are not effective.
Efficient management of physical resources	The amount of material used, scrap discarded, and amount of rework indicate that resources are being used efficiently.
Effective management of procurements	A procurement audit demonstrates that appropriate processes utilized were sufficient for the procurement and that the contractor is performing to plan.
Effective handling of change	Projects using a predictive approach have a change log that demonstrates changes are being evaluated holistically with consideration for scope, schedule, budget, resource, stakeholder, and risk impacts. Projects using an adaptive approach have a backlog that shows the rate of accomplishing scope and the rate of adding new scope.
Improved capability due to continuous learning and process improvement	Team status reports show fewer errors and rework with an increase in velocity.

65

NOTES

1. The “checking outcomes” table: the left column is what success looks like for the domain, the right column is the evidence that it happened. You won’t be asked to reproduce it, but it is a good structure for a written answer about the domain. Project work: efficient performance (status reports show the work on track), appropriate processes, good communication, efficient physical resources and procurement, and improved capability through learning.

EXAM ANGLE

Prediction

Q1

Which evidence supports “efficient and effective project performance”?

A The number of meetings

> Meeting count doesn’t show performance.

B A long list of tools

> Having tools doesn’t show results.

C **Status reports showing the work on track**

> That’s how the table checks it.

D A large budget

> Spending more doesn’t show efficiency.

 Delivery Performance Domain

Delivery Performance Domain 6

DELIVERY PERFORMANCE DOMAIN

The Delivery Performance Domain addresses activities and functions associated with delivering the scope and quality that the project was undertaken to achieve.

Effective execution of this performance domain results in the following desired outcomes:

- Projects contribute to business objectives and advancement of strategy.
- Projects realize the outcomes they were initiated to deliver.
- Project benefits are realized in the time frame in which they were planned.
- The project team has a clear understanding of requirements.
- Stakeholders accept and are satisfied with project deliverables.

66

EXAM ANGLE

Prediction Q1

Which is a desired outcome of the Delivery domain?

A Stakeholders accept and are satisfied with the deliverables

It's among the listed outcomes.

B The project avoids all change

That isn't an outcome here.

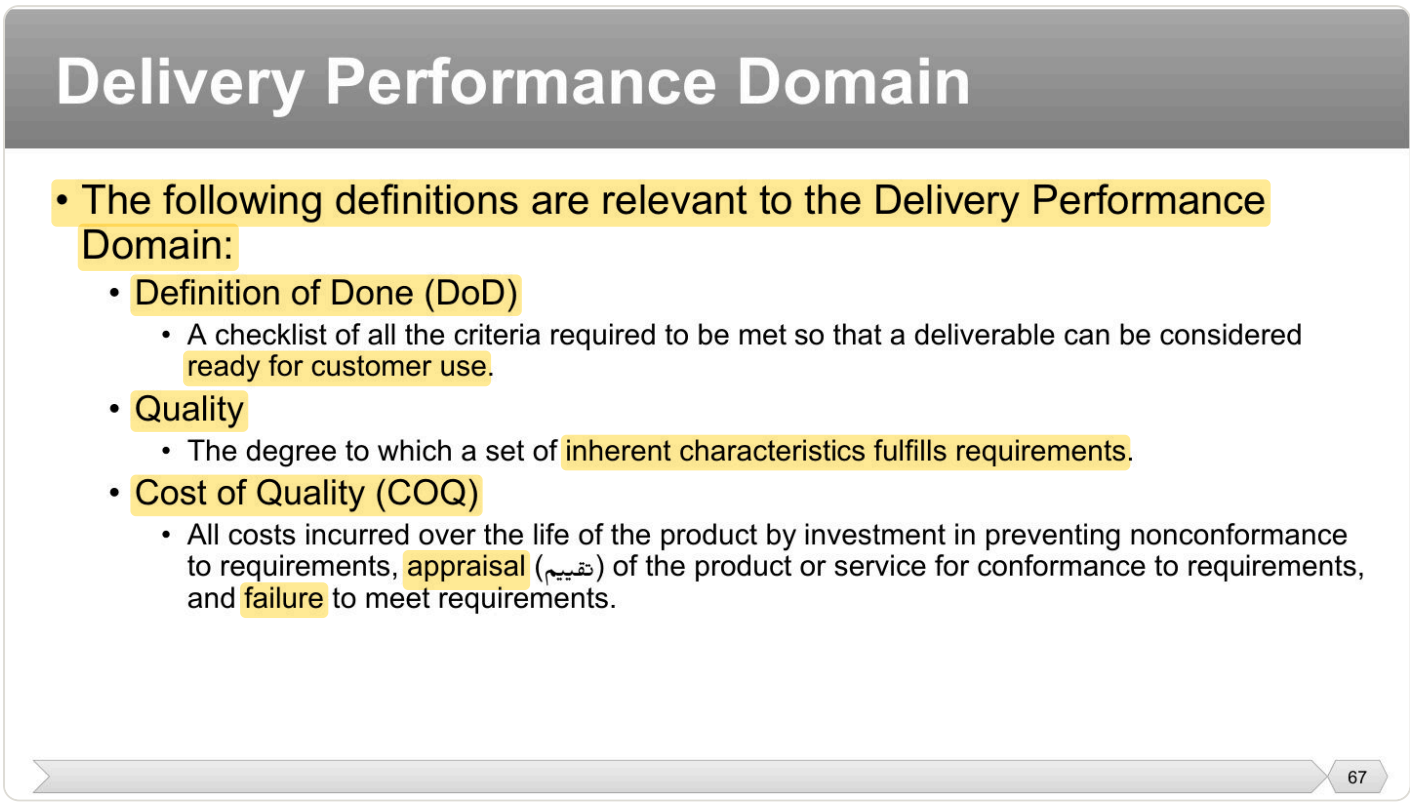
C The team finishes every sprint early

That isn't listed.

D Benefits are ignored after handover

Benefits should be realized.

 Delivery Performance Domain



NOTES

1. "Done" means different things to different people. A developer may mean "it runs on my machine", while a customer means "I can use it". The **definition of done** removes the argument by listing what has to be true.
2. **Quality** is measured against what was required, not how impressive something is. A simple tool that does exactly what was asked is high quality, while a beautiful one that misses a requirement isn't.
3. **Cost of quality (COQ)**: all costs over the product's life from **prevention** (training, standards), **appraisal** (testing, inspection) and **failure** (rework, warranty, lost customers). Chapter 7 develops it.

EXAM ANGLE

Prediction Q1

Which three kinds of cost make up the cost of quality?

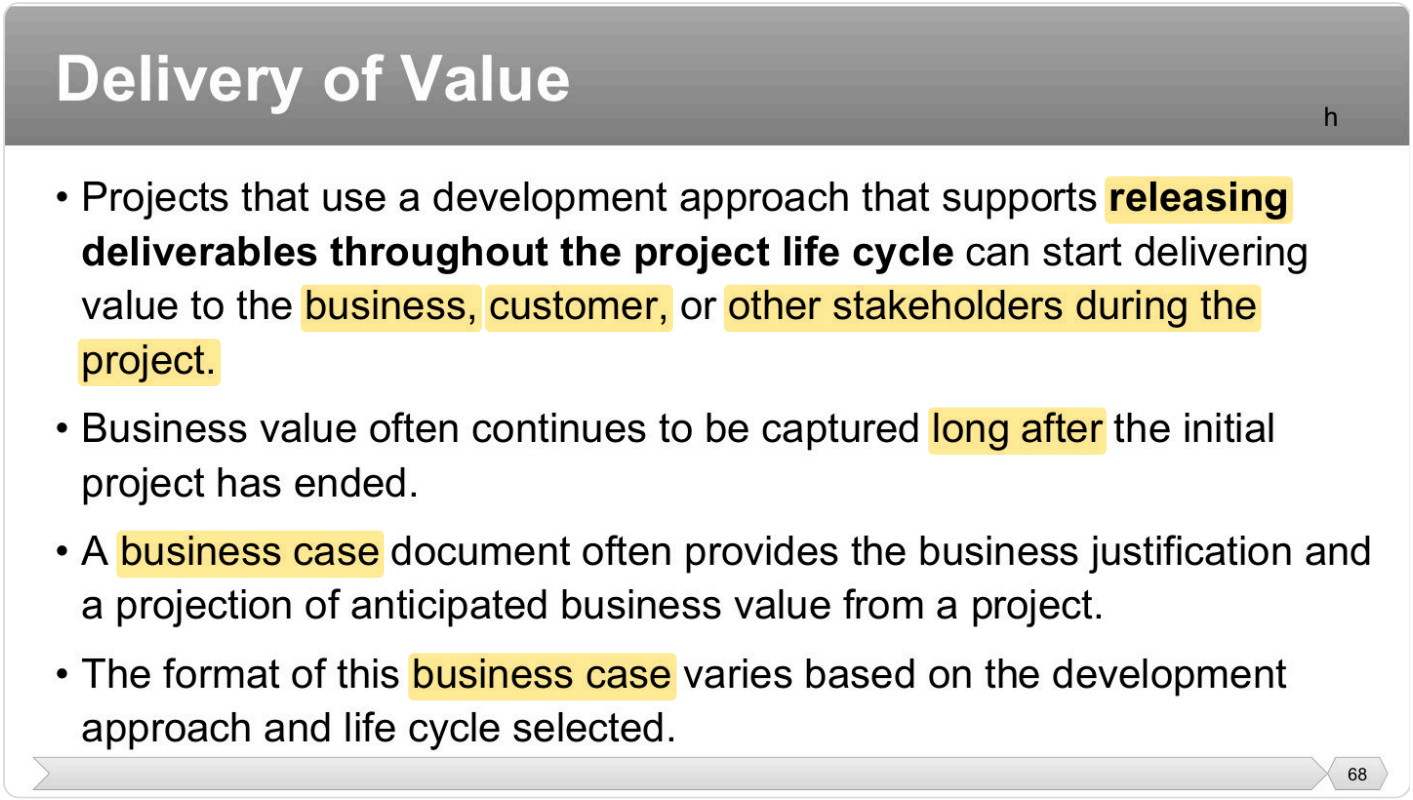
A Labor, materials, and overhead

B **Prevention, appraisal, and failure**

C Design, build, and test

D Fixed, variable, and sunk

 Delivery of Value



NOTES

1. If you ship in pieces, users benefit from the first piece right away, and it can start earning or saving money. With a single delivery at the end, the value only begins once **the project is over**.

2. The project team may have disbanded long ago while the product is still earning. So you can't judge a project's value on its closing day, and benefits may be measured for years **after the project ends**.

3. A **business case** answers "why is this worth doing?", and it's what you check later to see whether the value arrived. An adaptive project may use a lighter version, because the details are expected to change.

EXAM ANGLE

Prediction

Q1

Why can a project with frequent releases deliver value during the project?

A **Stakeholders can use released deliverables before the project ends**

> Value starts when something is usable.

B It doesn’t have a budget

> It still has one.

C Value only starts at closure

> That’s true only for a single end delivery.

D The business case gets removed

> A business case still exists.

Prediction

Q2

Business value can continue to be captured long after the project has ended.

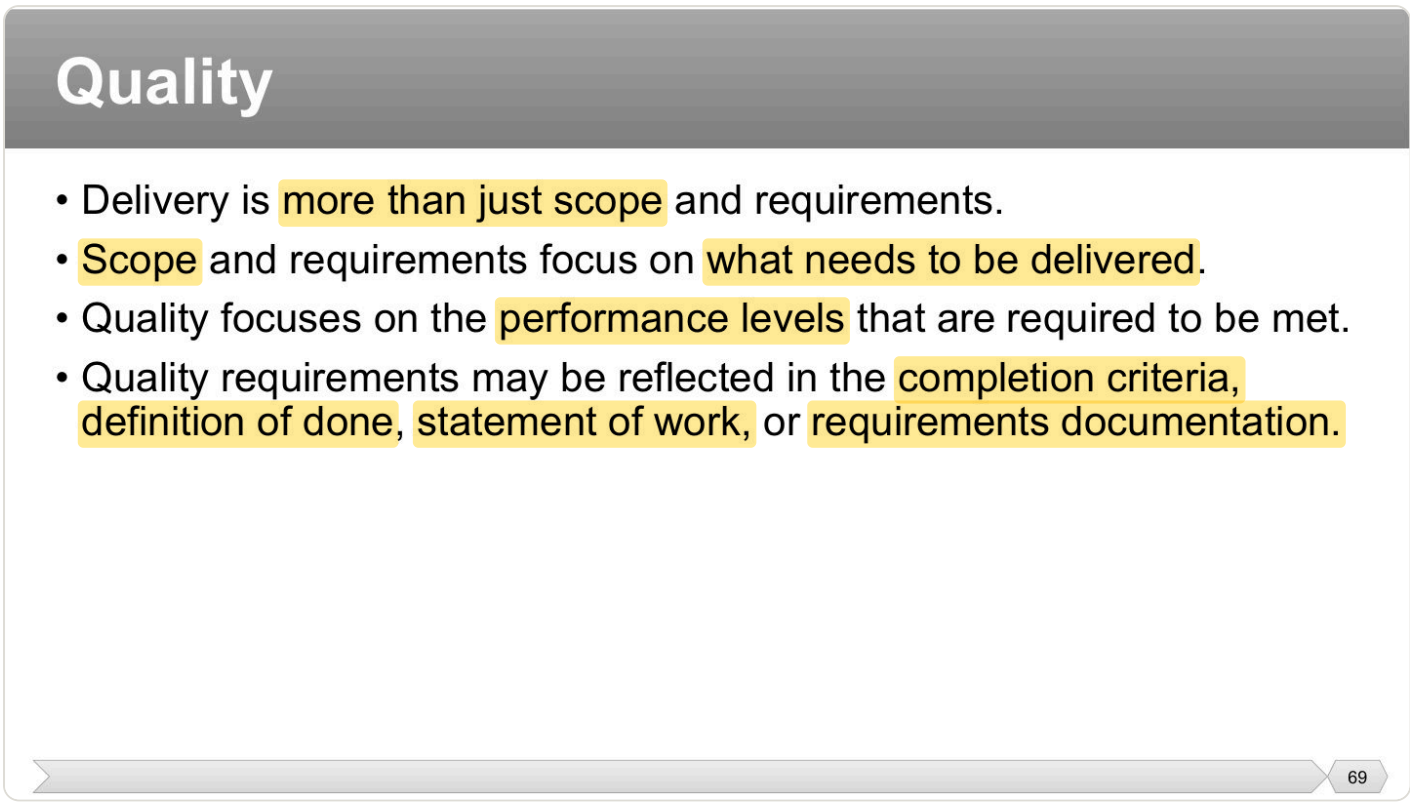
T **True**

> The slide says it often does.

F False

> Value can carry on after closure.

 Quality



NOTES

1. Delivering every requested feature can still fail. A system with all its functions but which crashes under load isn't a success, so **more than scope** has to be considered.
2. **Scope** is the list of things the customer gets. Ticking every item off the list tells you nothing about how well each one works.
3. Quality says **how well**: the **performance levels** that must be met (response time, reliability, accuracy).
4. A quality requirement only helps if the team can see it, so it needs writing down somewhere they use. Putting "loads in under 2 seconds" in the **definition of done** means it's checked each time.

EXAM ANGLE

Prediction Q1

A website has every feature requested but takes a minute to load. What's missing?

A A bidder conference

> That's about procurement.

B A project charter

> A charter doesn't address speed.

C **Quality: the required performance levels**

> Scope says what, while quality says how well.

D Scope: the requested features

> The features are all there.

Prediction Q2

Where might quality requirements be recorded?

A In the org chart

> That shows reporting lines.

B In the mood chart

> That's for team morale.

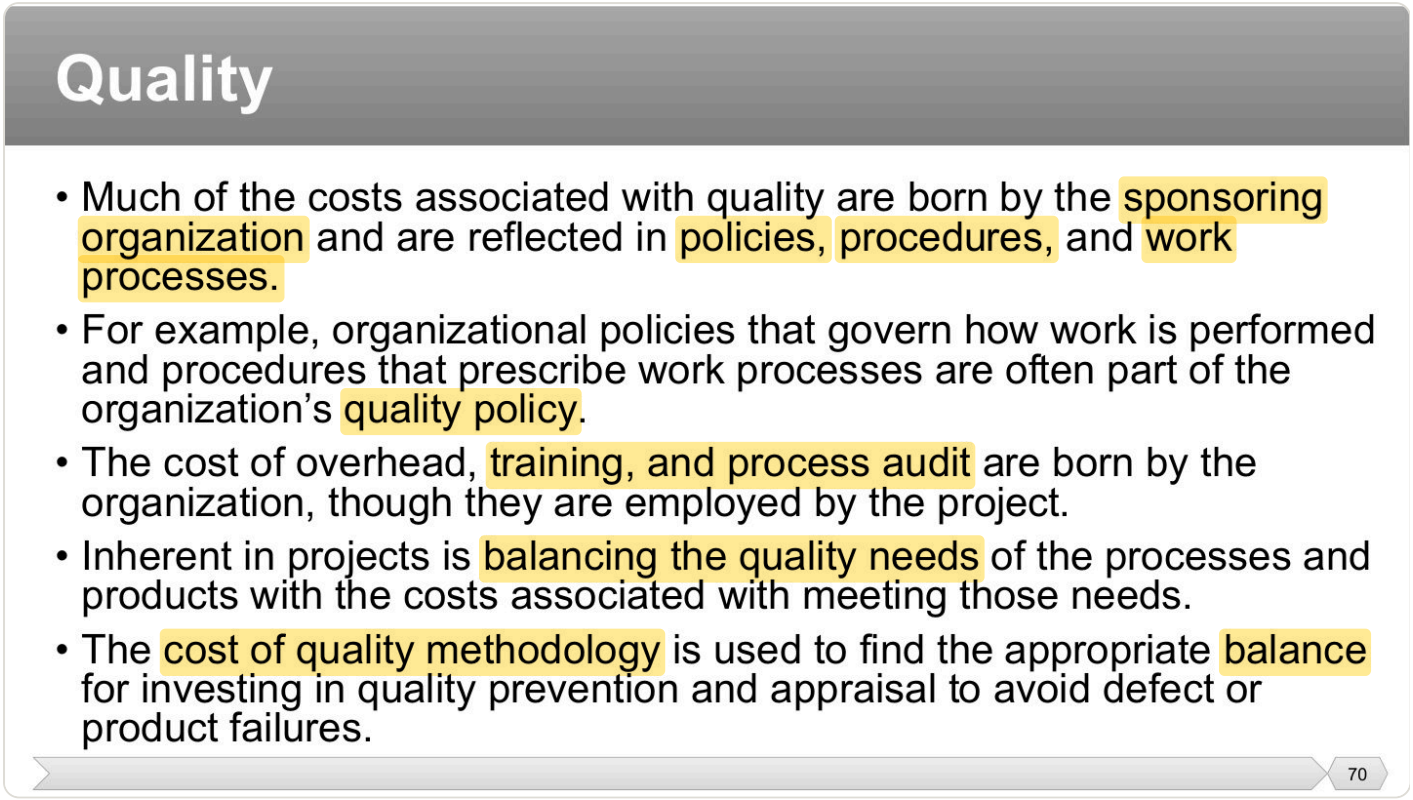
C **In the definition of done**

> It's one of the places listed.

D In the vendor's invoice

> That's a billing document.

 Quality



NOTES

1. Quality work is often paid for before your project starts. Standards and quality procedures already exist, which means the **sponsoring organization** absorbs much of this cost.
2. Company-wide rules, such as "all code needs review", express its **quality policy**. Your project inherits them, and you normally can't opt out.
3. Your project benefits from training and **audits** without paying for them directly. That's why the true cost of quality may be hidden from the project's budget.
4. Perfect quality would cost a fortune and take forever, while no quality causes failure. The right level is where further spending is no longer worth it, which is why projects **balance** quality against cost.
5. A bug found in review costs little, while one found by customers can cost far more. The **cost of quality** idea is that money spent on prevention usually saves more than it costs.

EXAM ANGLE

Prediction Q1

Who usually bears much of the cost of training and process audits?

A The customer

> The slide names the organization.

B Individual team members

> They don’t fund these.

C The vendor

> Vendors aren’t named here.

D The sponsoring organization

> It pays these, even though the project uses them.

Prediction Q2

What is the idea behind the cost of quality?

A Investing in prevention and appraisal to avoid more expensive failures

> That’s how it finds the balance.

B Spending unlimited money on quality

> Projects must balance quality with cost.

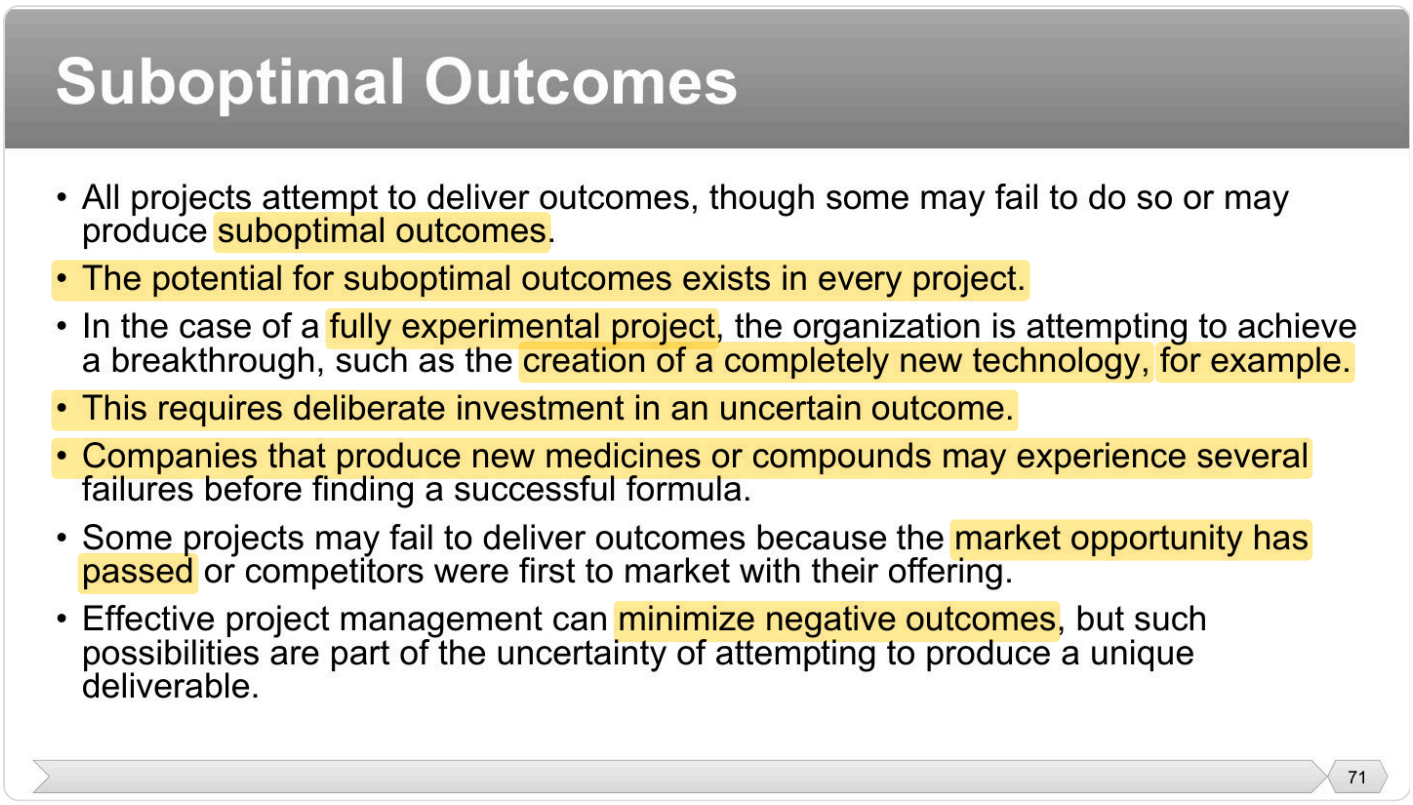
C Spending as little on quality as possible

> That can make failures more expensive.

D Removing all testing

> Appraisal is part of the cost of quality.

 Suboptimal Outcomes



NOTES

1. Doing everything right doesn't guarantee success, because projects create something new. So **suboptimal outcomes** aren't proof of bad management, and the question is whether you limited the damage.

2. Here failure is expected and paid for, since the organization knows it's buying a chance of a breakthrough. A drug company accepts many failures to find one medicine, so a **fully experimental** project needs judging differently.

3. A project can be delivered perfectly and still be too late. If a competitor launched first, the **market opportunity** may be gone. This is one more reason why speed of delivery has value.

4. You can reduce the chance and the cost of failure, but not remove them. **Good project management** spots trouble early and limits the damage, which is why exam answers saying it "eliminates" failure are wrong.

EXAM ANGLE

Prediction Q1

A company tests many compounds and most fail before one succeeds. How does the slide describe this?

A A scope management error

> Nothing here is about scope.

B Proof of a bad project manager

> Failure is part of the plan here.

C Deliberate investment in an uncertain outcome

> A fully experimental project expects this.

D A violation of ethics

> Nothing here is unethical.

Prediction Q2

Good project management can eliminate all negative outcomes.

T True

> The slide says the potential exists in every project.

F False

> It can minimize them, but uncertainty is part of producing something unique.

Checking Outcomes: Delivery

Checking Outcomes—Delivery Performance Domain

Outcome	Check
Projects contribute to business objectives and advancement of strategy	The business plan and the organization's strategic plan, along with the project authorizing documents, demonstrate that the project deliverables and business objectives are aligned.
Projects realize the outcomes they were initiated to deliver	The business case and underlying data indicate the project is still on track to realize the intended outcomes.
Project benefits are realized in the time frame in which they were planned	The benefits realization plan, business case, and/or schedule indicate that the financial metrics and scheduled deliveries are being achieved as planned.
The project team has a clear understanding of requirements	In predictive development, little change in the initial requirements reflects understanding. In projects where requirements are evolving, a clear understanding of requirements may not take place until well into the project.
Stakeholders accept and are satisfied with project deliverables	Interviews, observation, and end user feedback indicate stakeholder satisfaction with deliverables. Levels of complaints and returns can also be used to indicate satisfaction.

NOTES

1 The "checking outcomes" table: the left column is what success looks like for the domain, the right column is the evidence that it happened. You won't be asked to reproduce it, but it is a good structure for a written answer about the domain. Delivery: contribution to strategy and business objectives (checked against the business case), outcomes realized, benefits realized on time (benefits realization plan), clear understanding of requirements, and stakeholder acceptance.

EXAM ANGLE

Prediction Q1

What is a benefits realization plan used to check?

A Who reports to whom

> That's an org chart.

B Which vendor is cheapest

> That's procurement.

C Whether benefits arrive in the planned time

> That's what the table uses it for.

D Whether team members are happy

> That's checked in another way.

 Measurement Performance Domain

Measurement Performance Domain 7

MEASUREMENT PERFORMANCE DOMAIN

The Measurement Performance Domain addresses activities and functions associated with assessing project performance and taking appropriate actions to maintain acceptable performance.

Effective execution of this performance domain results in the following desired outcomes:

- A reliable understanding of the status of the project.
- Actionable data to facilitate decision making.
- Timely and appropriate actions to keep project performance on track.
- Achieving targets and generating business value by making informed and timely decisions based on reliable forecasts and evaluations.

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EXAM ANGLE

Prediction Q1

Which is a desired outcome of the Measurement domain?

A Actionable data for decisions

Data has to help people decide.

B Measuring only after closure

Timely action needs data during the project.

C Removing all forecasts

Reliable forecasts are part of it.

D As many reports as possible

Volume isn't the goal.

 Measurement Performance Domain

Measurement Performance Domain

- The following definitions are relevant to the Measurement Performance Domain:
  - Metric
    - A description of a project or product attribute and how to measure it (ex: work progress %).
  - Baseline
    - The approved version of a measure used as a basis for comparison to actual results (cost of a project, duration).
  - Dashboard
    - A set of charts and graphs showing progress or performance against important measures of the project.

74

NOTES

1. "Progress is good" isn't a **metric**. It becomes one when you state what you're measuring and how: "percent of planned work finished". That lets two people get the same answer.
2. You can't say you're behind without something to compare with. The **baseline** is the agreed plan, and it's approved so that it can't quietly be changed to make results look better.
3. A **dashboard** gives a quick view. Rather than reading a long report, someone can see in a glance what's off track and then ask about it.

EXAM ANGLE

Prediction Q1

The approved version of a measure that actual results are compared against is called a:

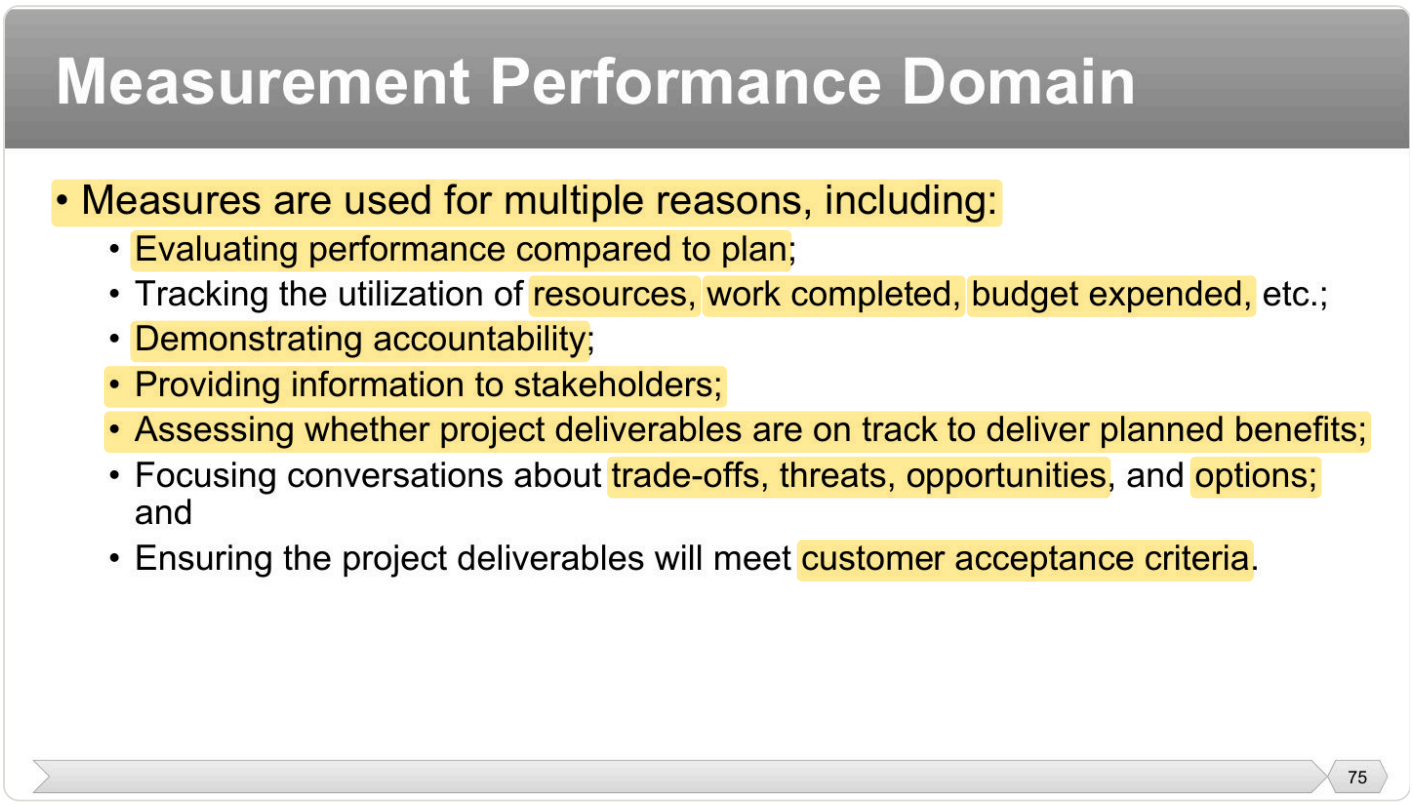
A Forecast

B Metric

C Dashboard

D **Baseline**

 Measurement Performance Domain



NOTES

1. Measuring tells you whether reality matches the plan while there's still time to act. You can't correct a budget overrun that you only find out about at the end.
2. Numbers keep things honest. **Accountability** is easier to show with a record of what was promised and delivered, and stakeholders get facts rather than reassurance.
3. A project can be on time and still heading for no benefit. Data also makes hard discussions easier: "we'll miss this date, so which feature do we drop?" is better than opinions, and it helps **focus conversations**.
4. It's far better to learn that a deliverable will fail before handing it over. Testing against **customer acceptance criteria** along the way avoids a nasty surprise at sign-off.

EXAM ANGLE

Prediction Q1

Which is a reason given for using measures?

A Replacing all stakeholder meetings

> Measures help focus conversations rather than replace them.

B Removing the need for a plan

> They compare performance against the plan.

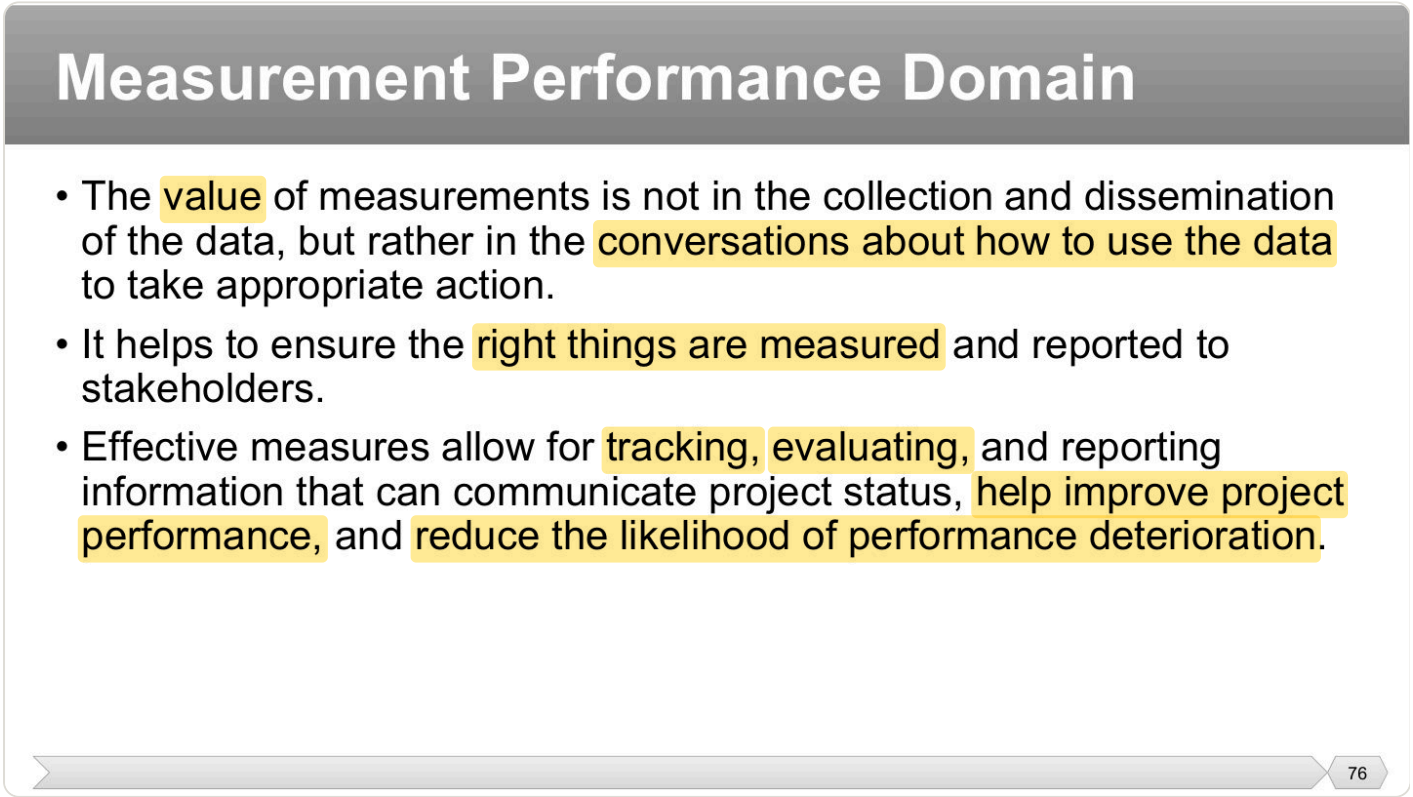
C Avoiding trade-off discussions

> They help focus those discussions.

D Demonstrating accountability

> It’s on the slide’s list.

SLIDE 76 / 107 **Measurement Performance Domain**



NOTES

1 A report nobody acts on is wasted work. The **value** comes when someone asks “this number looks bad, so what do we do?”. If no decision comes out of it, the measure isn’t helping.

2. Those conversations also expose bad measures. If people keep ignoring a number, it may be the wrong thing to track. So talking about data helps you measure the **right things**.

3. Slow decline is the hard kind to notice, since each week looks only slightly worse. Tracking over time reveals the trend, so you can act before performance **deteriorates** badly.

EXAM ANGLE

Prediction Q1

Where does the slide say the value of measurement lies?

A In the conversations about how to use the data to act

> Data alone changes nothing.

B In hiding bad results

> That would defeat the point.

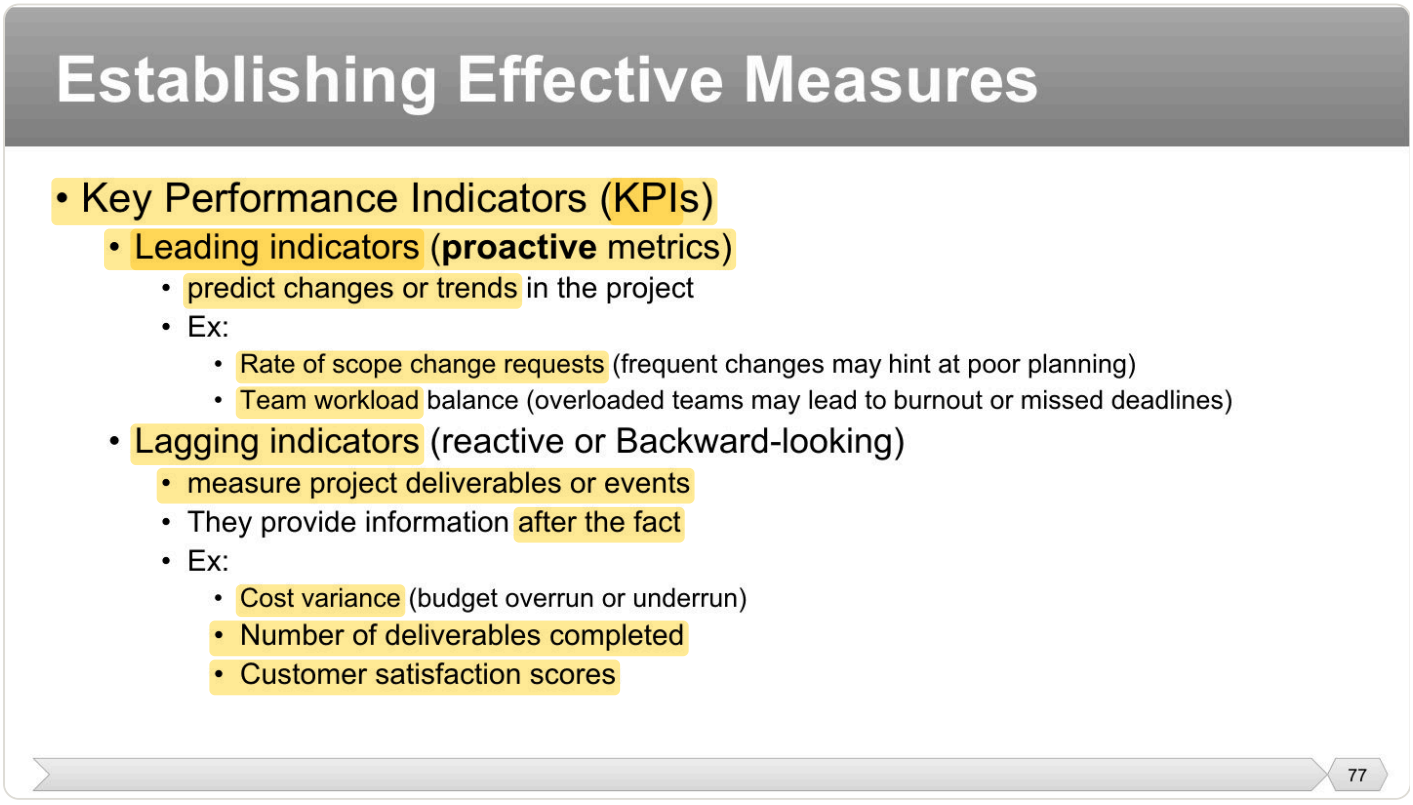
C In collecting as much data as possible

> The slide says the value isn't in collection.

D In distributing many reports

> It specifically says dissemination isn't the value.

SLIDE 77 / 107 **Establishing Effective Measures**



NOTES

1. A **KPI** is one of the few measures that really shows whether things are going well. **Leading** indicators are the valuable kind because they warn you early, like dark clouds before rain, while you can still act.

2. Why do these predict trouble? Lots of scope change requests suggest that requirements weren't understood, so delays are likely to follow. An overloaded team will soon start missing dates, which is why **team workload** is worth watching now.

3. **Lagging** indicators report what already happened, like a final exam grade. They're accurate and easy to measure, but it's too late to change that result. You can only learn from them.

4. Cost variance can only be calculated after the money is spent, and satisfaction only after people use the product. So you need both: leading to steer and lagging to confirm. Leading looks ahead; lagging looks back.

EXAM ANGLE

Prediction

Q1

Which of these is a leading indicator?

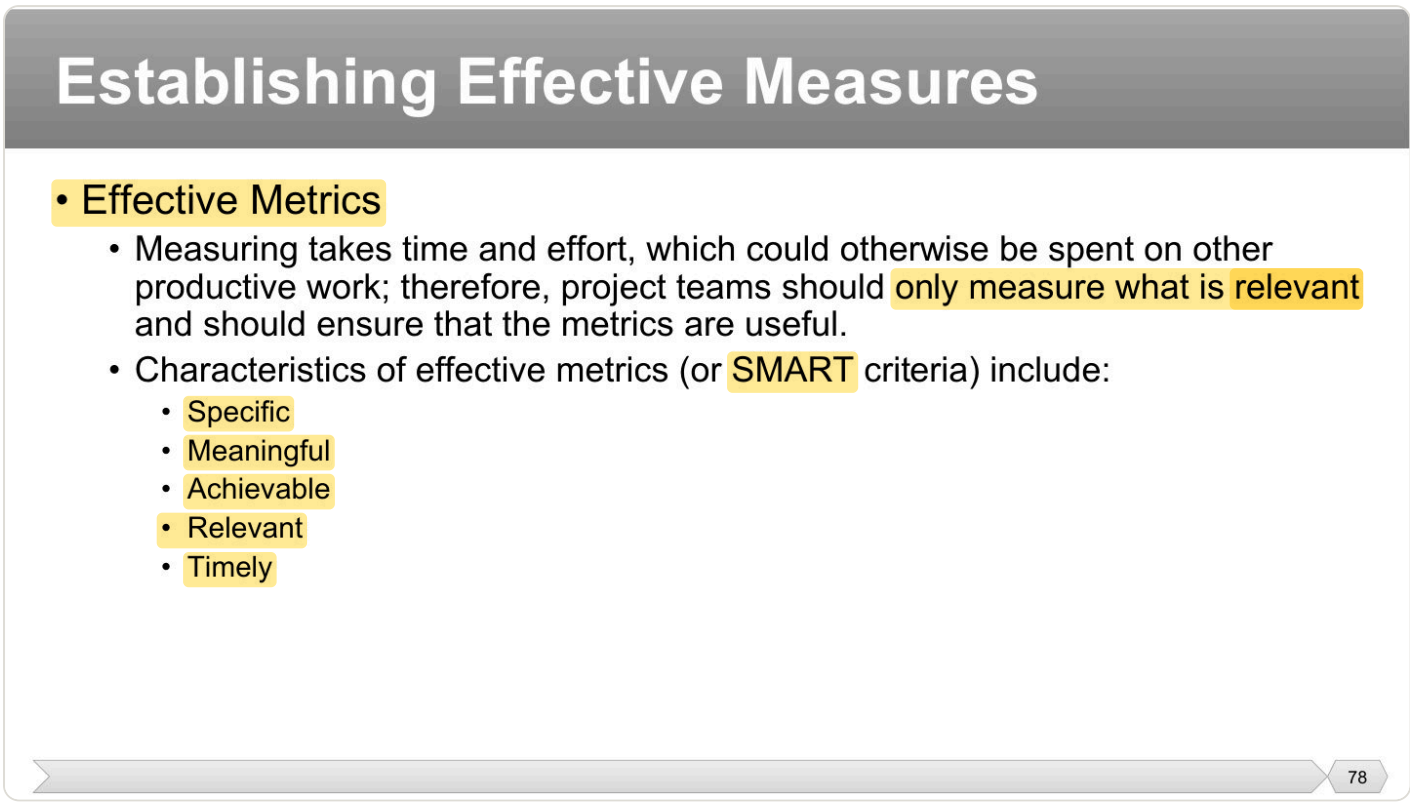
A Customer satisfaction score

B Cost variance

C Number of deliverables completed

D **Team workload balance**

 Establishing Effective Measures



NOTES

1. Measurement isn't free, since every hour spent collecting data is an hour not spent building. So ask of each measure "what would we do differently if this changed?", and if nothing, drop it.

2. Effective metrics are **SMART**: Specific, **Meaningful**, Achievable, Relevant, Timely. Note that in this slide the M is "meaningful", not the usual "measurable": a classic trap.

EXAM ANGLE

Prediction Q1

On this slide, what does the M in SMART stand for?

A Measurable

That’s the common version, but it’s not what this slide says.

B Monitored

That’s not on the slide.

C **Meaningful**

The slide uses Meaningful, not the usual Measurable.

D Manageable

That’s not on the slide.

Prediction Q2

Why should teams only measure what is relevant?

A **Measuring takes time that could go to other productive work**

Measurement has a cost.

B Metrics never help

Useful metrics do help.

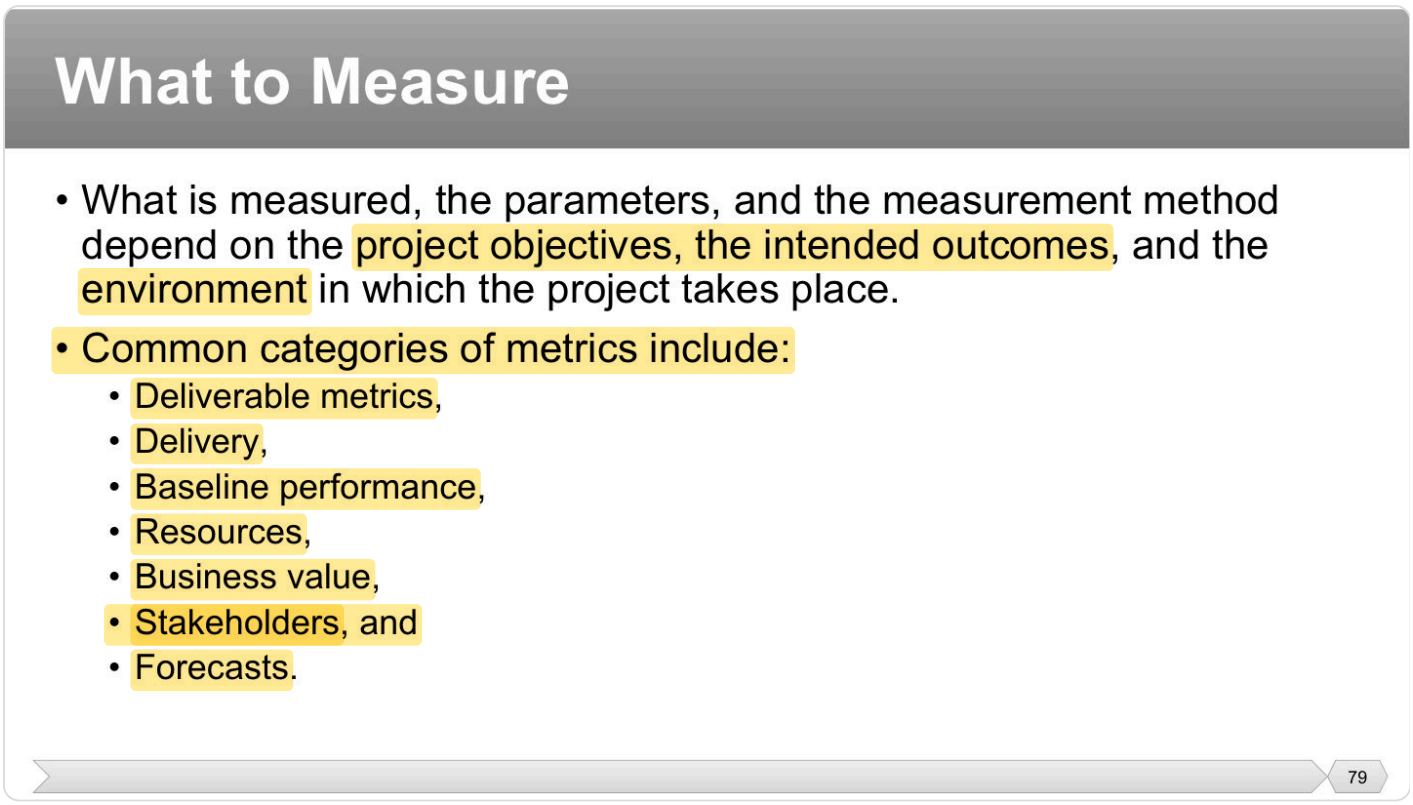
C Relevant metrics are free to collect

All measuring takes effort.

D Measuring is forbidden by the standard

It’s encouraged when useful.

 What to Measure



NOTES

1. There's no universal set. A safety-critical system tracks defects closely, while a marketing campaign watches customer response. So start from what success means for this project and **environment**.

2. The categories ask different questions: is it good (**deliverable**), is it flowing (**delivery**), are we on plan (**baseline**), are we using things well (**resources**), is it worth it (**business value**), are people happy (**stakeholders**), where will we end up (**forecasts**)? Slides 80–81 give examples of each.

EXAM ANGLE

Prediction Q1

Which is NOT one of the common categories of metrics?

A Forecasts

> This is on the list.

B Baseline performance

> This is on the list.

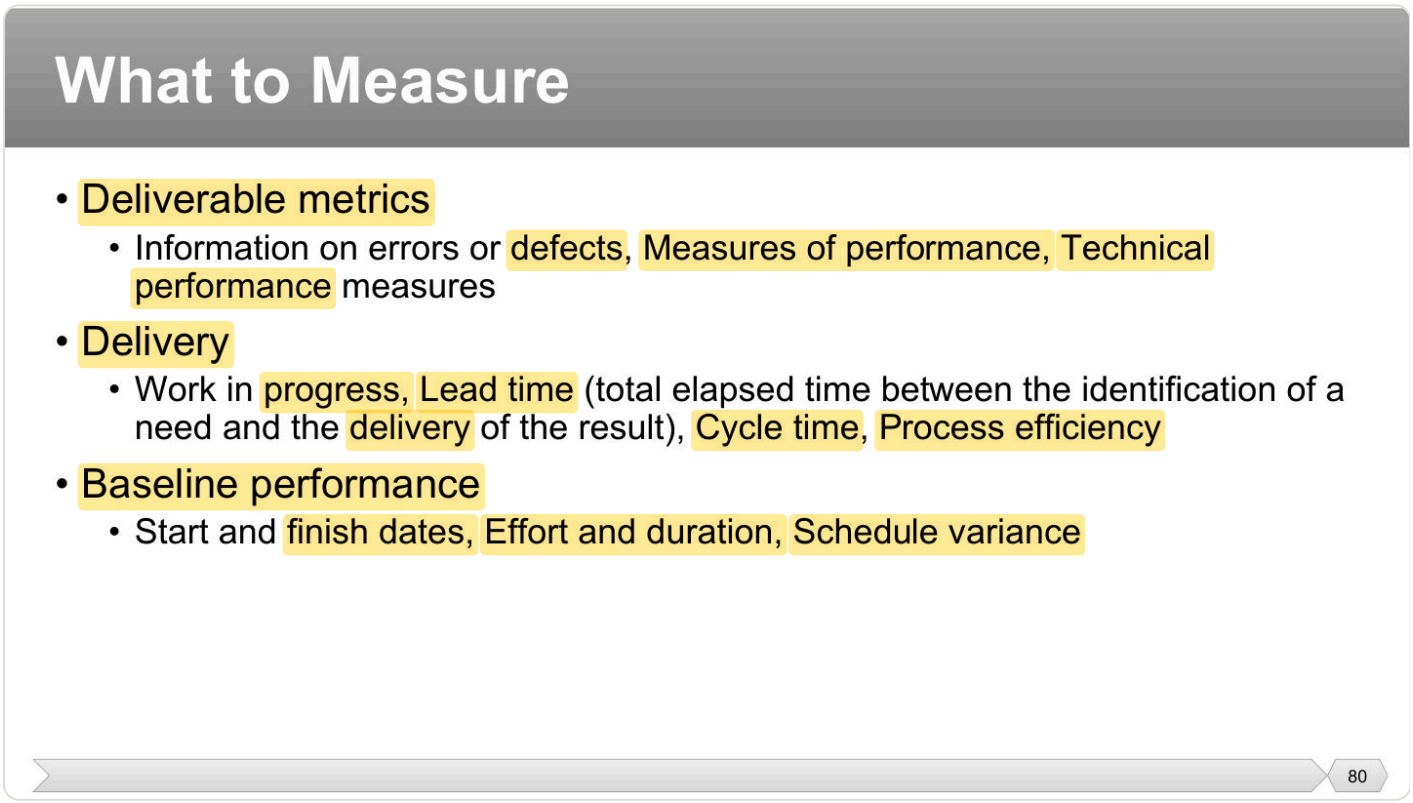
C Business value

> This is on the list.

D **Procurement authority**

> That isn't a metric category.

SLIDE 80 / 107 **What to Measure**



NOTES

1 These judge the thing being built. A high count of **defects** warns of trouble even when the schedule looks fine, and **technical performance** checks things like speed against the target.

2. **Delivery**: work in progress, **lead time** (from identifying the need to delivering the result: the customer's whole wait), **cycle time** (from starting the work to finishing it), process efficiency.

3. These compare reality to the approved plan. **Schedule variance** is the gap: a negative number means you're behind, which tells you how far you've drifted and that you may need to act.

EXAM ANGLE

Prediction Q1

Lead time measures:

A Only the time spent coding

> That's closer to part of cycle time.

B The total time from identifying a need to delivering the result

> That's the customer's whole wait.

C The total budget

> That's a cost measure.

D Team morale

> That's a stakeholder metric.

Prediction Q2

Schedule variance belongs to which category?

A Business value

> That covers ROI and NPV.

B Baseline performance

> It compares actual progress with the baseline.

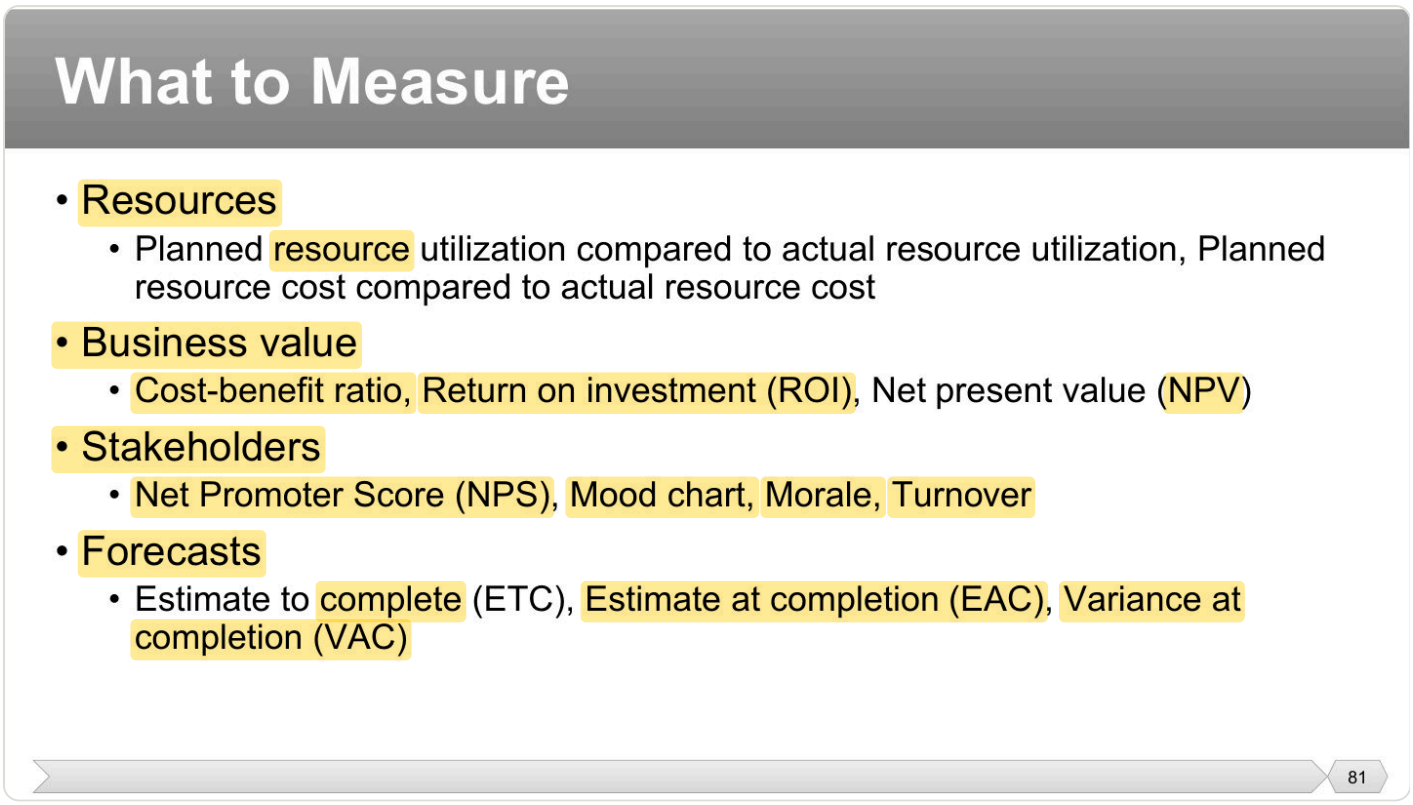
C Stakeholders

> That covers things like NPS and morale.

D Resources

> That covers planned and actual resource use.

 What to Measure



NOTES

1. Comparing plan and actual reveals problems early. Using far more of a **resource** than planned hints that the estimate was wrong, and that the cost will overrun too.
2. These ask “is this worth the money?” in different ways. **ROI** compares gain to cost, while **NPV** also accounts for money later being worth less than money today. They’re what a sponsor cares about.
3. Unhappy people are an early warning sign. **NPS** asks how likely customers are to recommend you, while morale and **turnover** show the team’s health. Losing people is expensive and a sign something’s wrong.
4. **Forecasts**: estimate to complete (ETC: what is left), **estimate at completion (EAC**: the expected total), variance at completion (VAC = budget − EAC).

EXAM ANGLE

Prediction Q1

Net Promoter Score belongs to which category?

A Forecasts

> That covers ETC, EAC and VAC.

B Stakeholders

> It's listed with mood chart, morale and turnover.

C Business value

> That covers ROI and NPV.

D Delivery

> That covers work in progress and lead time.

Prediction Q2

EAC is the:

A Difference between budget and forecast

> That's VAC.

B Return on investment

> That's ROI.

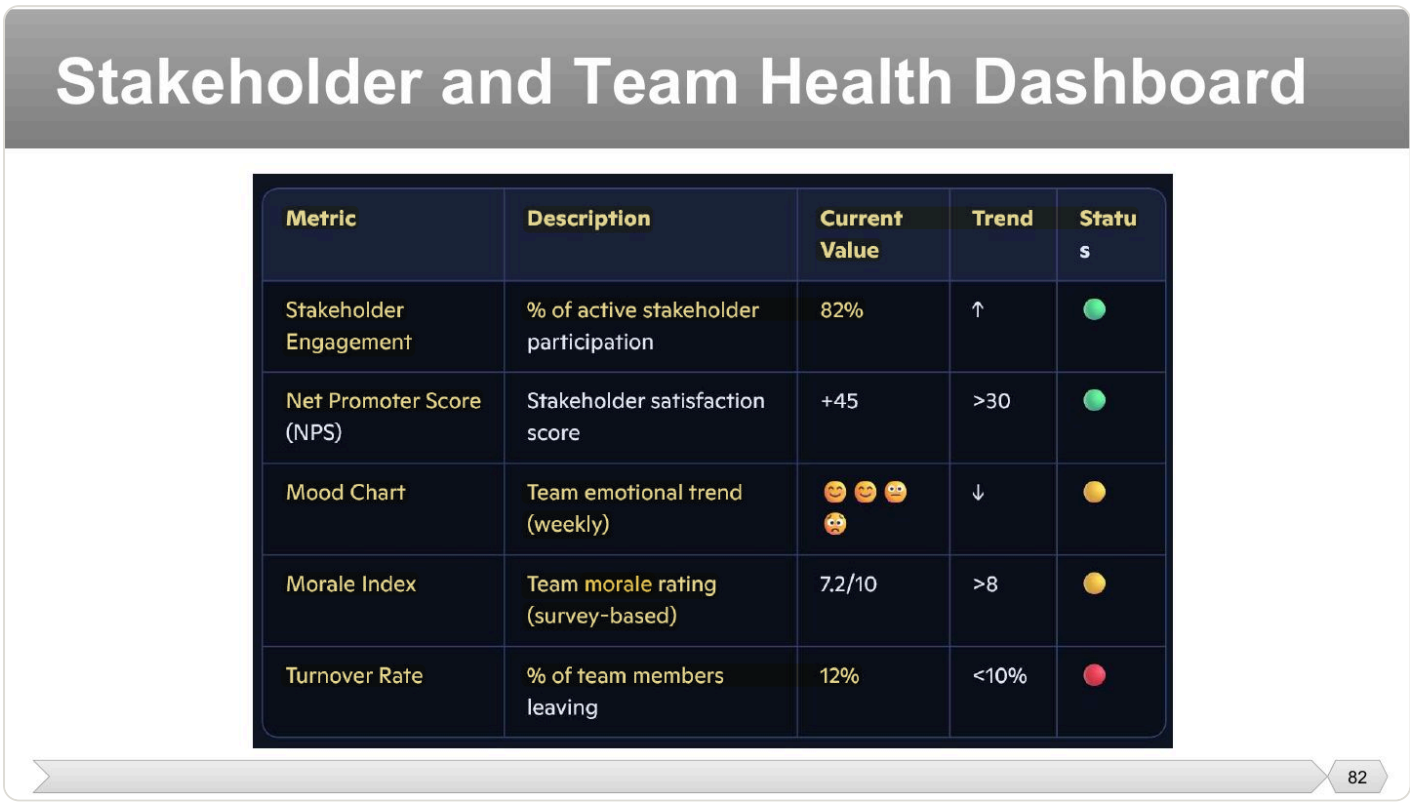
C Cost still remaining

> That's ETC, estimate to complete.

D Expected total cost at completion

> Estimate at completion is the forecast total.

 Stakeholder and Team Health Dashboard



NOTES

1. An example dashboard for the stakeholder and team metrics of slide 81. Each row has a current value, a trend arrow, a target and a red/amber/green status. **Stakeholder engagement**: 82% active participation, rising, green.
2. **NPS** +45 against a target of >30 (green). Mood chart and morale (7.2/10 vs. >8) are amber.
3. **Turnover** 12% against a target of <10% is red: the item needing action. A dashboard's job is exactly this, pointing attention at what is off track.

EXAM ANGLE

Prediction Q1

What does a red status on the dashboard tell you?

A The data can be ignored

> Red means look at it.

B The project is cancelled

> It flags one measure only.

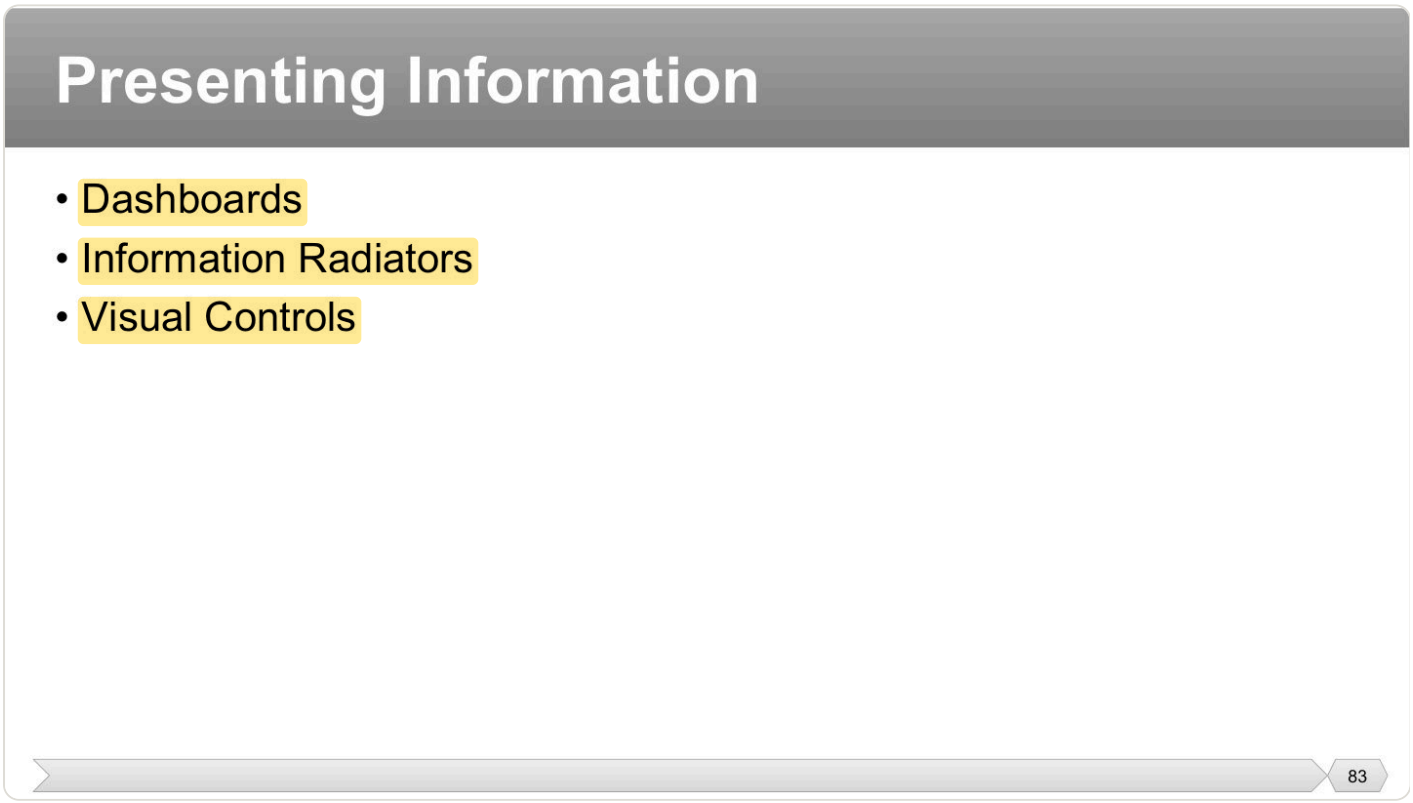
C The item is ahead of target

> That's the opposite.

D This item needs action

> A dashboard points attention at what's off track.

SLIDE 83 / 107 **Presenting Information**



NOTES

1. **Dashboards**: summary displays of the key measures, usually electronic (slide 84).
2. **Information radiators**: large, visible displays placed where everyone sees them without asking (slide 85).

3 **Visual controls**: task boards, burn charts and other charts that show the flow of work (slide 86).

TIPS & TRICKS

- **DIV**, like the HTML tag: Dashboards, Information radiators, Visual controls.

EXAM ANGLE

Prediction Q1

A big burndown chart hangs where everyone on the team can see it. What is this?

A **An information radiator**

> It's a large display visible without asking.

B A statement of work

> That's a procurement document.

C A phase gate

> That's a review.

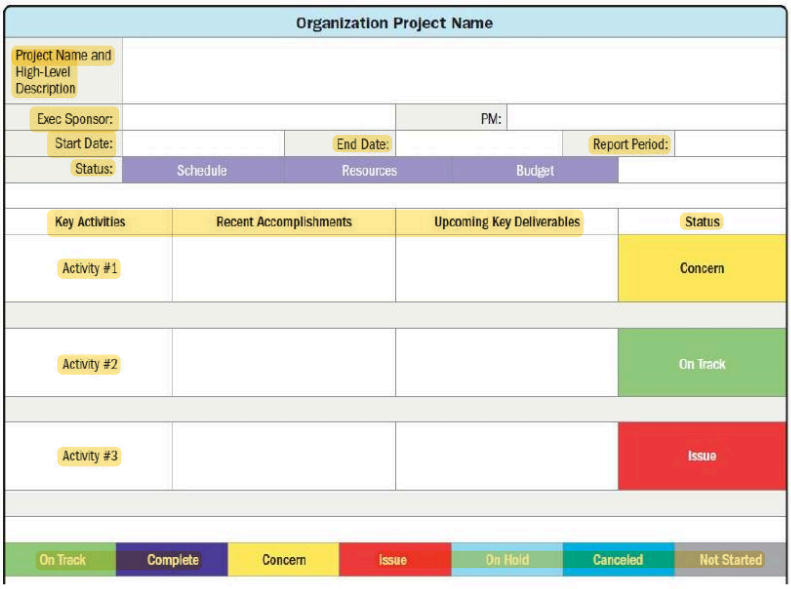
D A contingency reserve

> That's money set aside.

 Dashboards

Presenting Information

- Dashboards



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NOTES

1 A project **dashboard** template: project name, sponsor, PM, dates, overall status for schedule, resources and budget, then key activities with recent accomplishments, upcoming deliverables and a coloured status (concern, on track, issue). The legend at the bottom defines the colour codes.

EXAM ANGLE

Prediction Q1

What does a project dashboard usually do?

A Summarize key status and measures at a glance

It's meant to be read quickly.

B Replace the contract

It reports status.

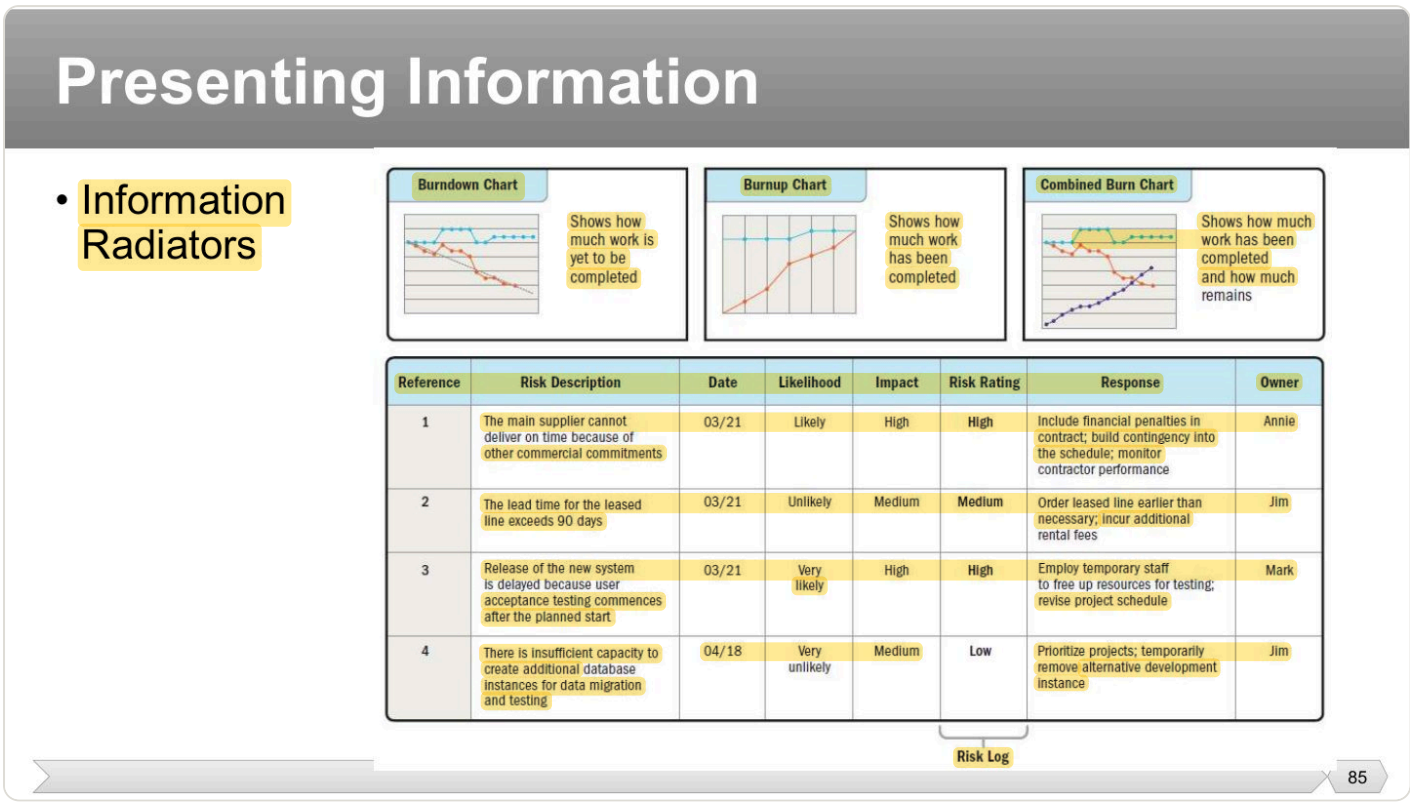
C Hold all the source code

That's a code repository.

D Authorize the project

That's the charter.

 Information Radiators



NOTES

1. An **information radiator** is a big visible display, such as a burnup or burndown chart or a risk log, placed where the team works, so status is visible without asking anyone. (Also called a "big visible chart".)

EXAM ANGLE

Past exam · Final 242 · Q6.2 — Q1

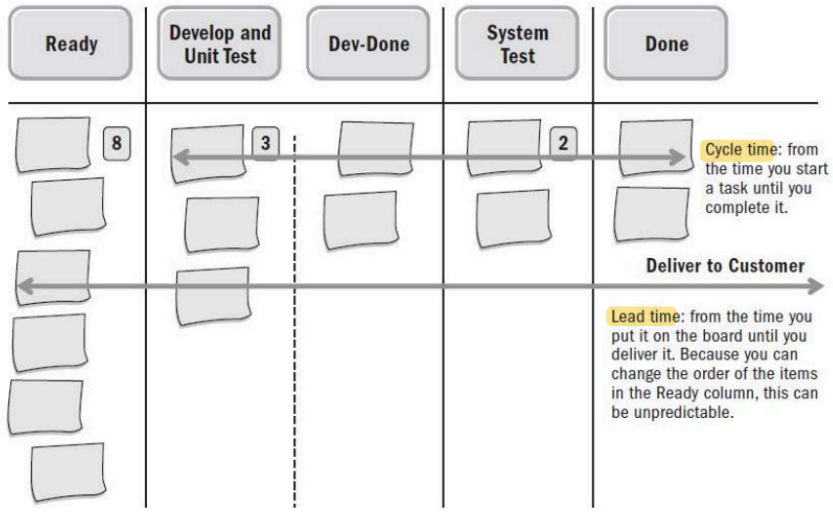
How can a burn chart help a project manager track progress and identify if the team is ahead or behind schedule?

Answer: A burndown chart plots the work remaining (e.g. story points) against time, next to an ideal line from the total down to zero at the end of the sprint. If the actual line is above the ideal line the team is behind; below it, ahead. A burnup chart shows completed work rising toward the scope line and also reveals scope changes. Either one gives an early warning, so the PM can act (remove blockers, re-prioritize, adjust scope) before the deadline.

 Visual Controls

Presenting Information

- Visual Controls
  - Task boards
  - Burn charts
  - Other types of charts



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NOTES

1. **Task boards** make the flow of work visible: columns Ready → Develop and unit test → Dev-done → System test → Done, with work-in-progress limits (the boxed numbers).
2. **Burn charts** show work remaining (burndown) or completed (burnup) over time.
3. On the board: **cycle time** runs from when work starts on an item until it is complete; **lead time** runs from when the item is put on the board until it is delivered. Lead time is longer, because items wait in Ready and their order can change.

EXAM ANGLE

Past exam · Final 251 · Q6.1 — Q1

What does a burndown chart measure, and how are its two axes labeled in Agile project management?
Answer: It measures the work remaining against time, showing whether the team will finish on schedule. X-axis: time (days of the sprint, or sprints/iterations). Y-axis: work remaining (story points, hours or tasks).

Checking Outcomes: Measurement

Checking Outcomes—Measurement Performance Domain

Outcome	Check
A reliable understanding of the status of the project	Audit measurements and reports demonstrate if data is reliable.
Actionable data to facilitate decision making	Measurements indicate whether the project is performing as expected or if there are variances.
Timely and appropriate actions to keep project performance on track	Measurements provide leading indicators and/or current status leads to timely decisions and actions.
Achieving targets and generating business value by making informed and timely decisions based on reliable forecasts and evaluations	Reviewing past forecasts and current performance demonstrates if previous forecasts reflect the present accurately. Comparing the actual performance to the planned performance and evaluating business documents will show the likelihood of achieving intended value from the project.

NOTES

1 The "checking outcomes" table: the left column is what success looks like for the domain, the right column is the evidence that it happened. You won't be asked to reproduce it, but it is a good structure for a written answer about the domain. Measurement: a reliable understanding of status (audits of measures), actionable data (data shows whether to act), timely action (leading indicators prevent surprises) and business value from informed decisions.

EXAM ANGLE

Prediction Q1

Which evidence supports "timely actions"?

A Leading indicators help prevent surprises

They give time to act.

B Only reviewing results after closure

That's too late to act.

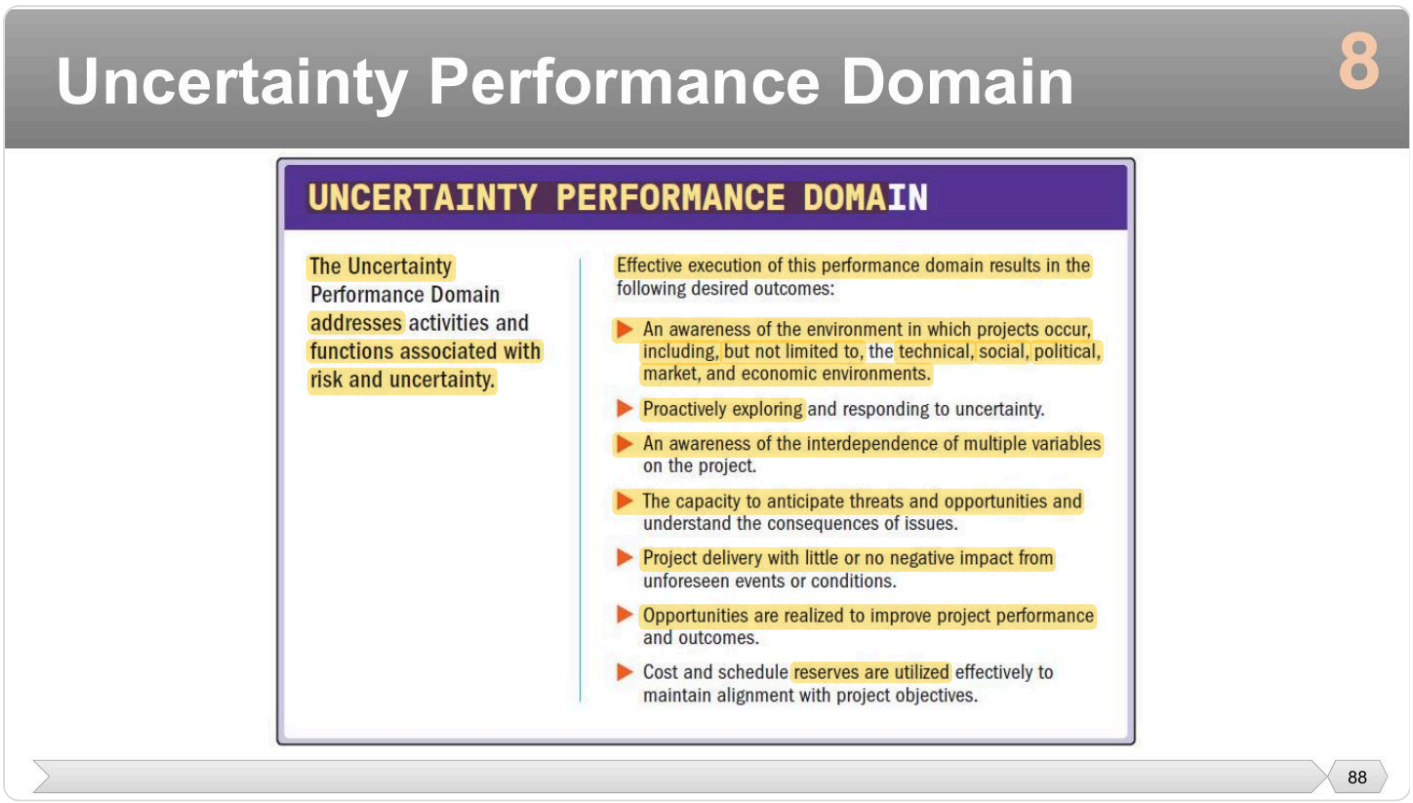
C Reporting only good news

That hides what needs action.

D Removing all metrics

You can't act without information.

 Uncertainty Performance Domain



NOTES

1. Outcomes: awareness of the environment (technical, social, political, market, economic), **proactive** exploration of and response to uncertainty, awareness of how variables depend on each other, anticipating threats and opportunities, delivery with little impact from surprises, and opportunities realized.

EXAM ANGLE

Prediction — Q1

Which is an outcome of the Uncertainty domain?

A Ignoring the environment

> Awareness of the environment is an outcome.

B **Cost and schedule reserves used effectively**

> It's among the listed outcomes.

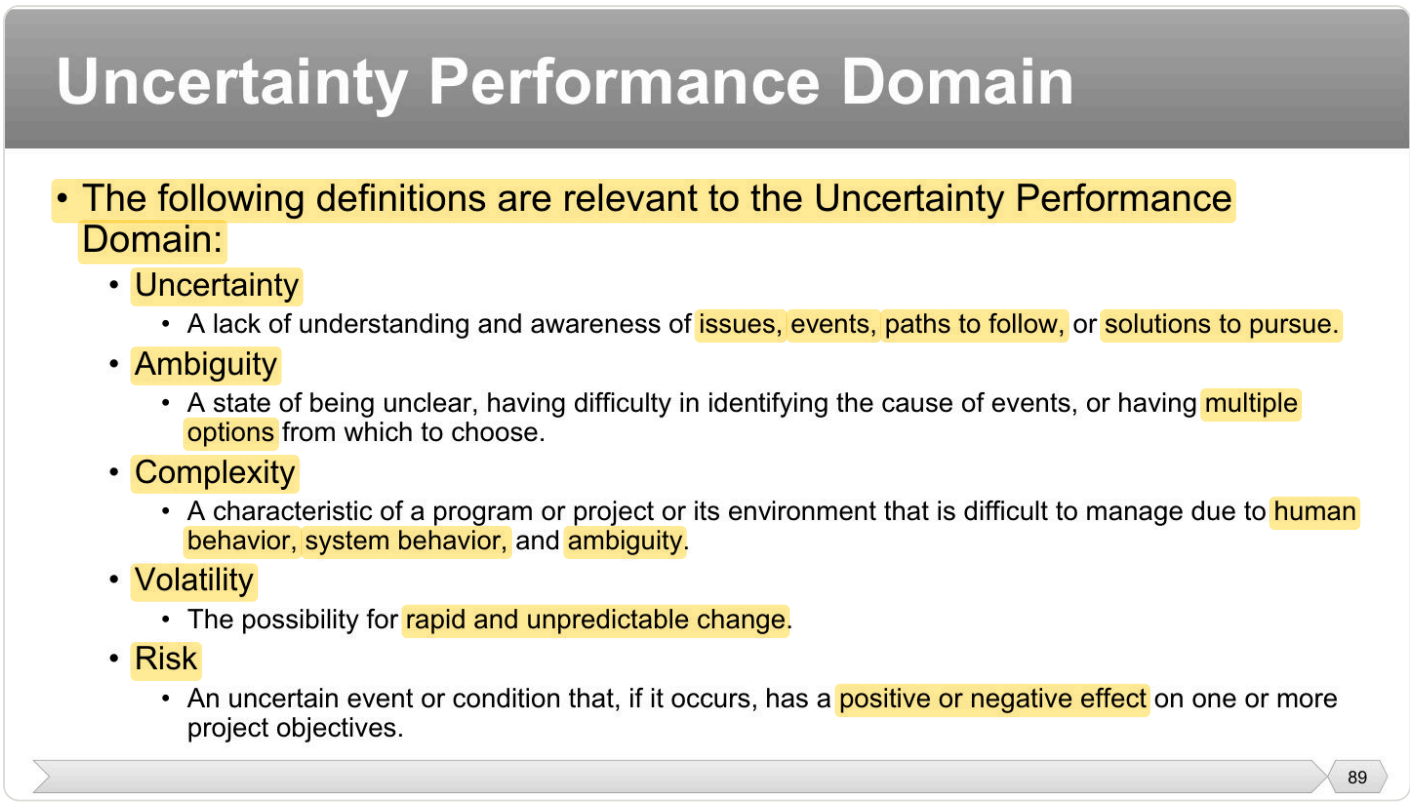
C Reacting only after problems happen

> The domain wants proactive responses.

D No risks exist

> Every project has risks.

 Uncertainty Performance Domain



NOTES

1. **Uncertainty** is the umbrella term, meaning you simply don't know something, like whether a new technology will work. The other terms on this slide are different kinds of not knowing.
2. The key feature of **ambiguity** is unclarity rather than lack of data. Several answers seem possible and you can't tell which is right, like not knowing which of **multiple options** fixes a bug.
3. Many parts affecting one another make results hard to predict. **Complexity** isn't the same as being difficult: a hard math problem can be solved, while a system of people and interacting parts can surprise you.
4. Think of how **volatility** works in a market: a steel price jumping 30% in a month. You may understand it well, and it can still change without warning.
5. A **risk** is specific: "the vendor may deliver late". It may happen or not. Exam trap: the definition includes **positive** effects, so a risk isn't always bad.

TIPS & TRICKS

- **CRAVe**: Complexity, Risk, Ambiguity, Volatility.

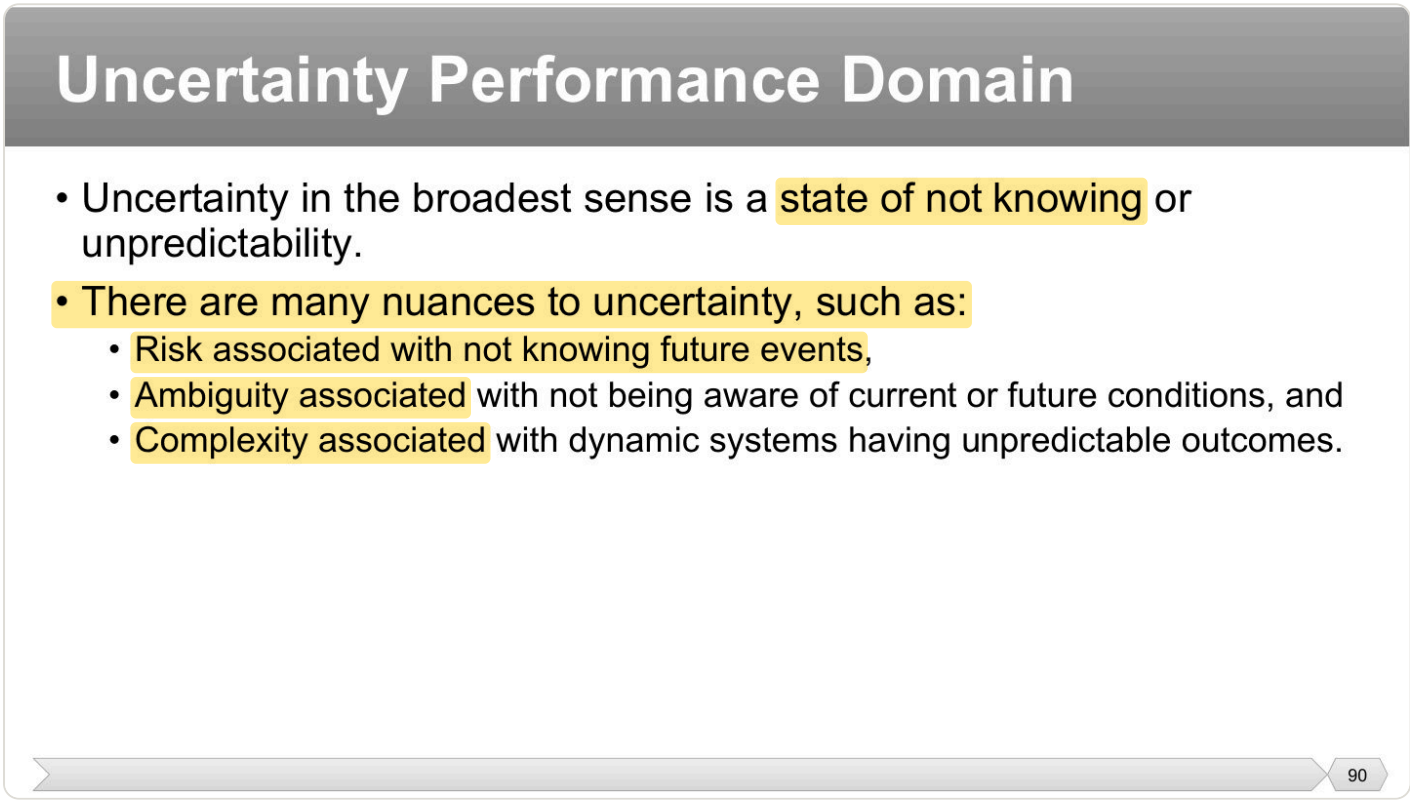
EXAM ANGLE

Prediction Q1

"The possibility for rapid and unpredictable change" defines:

- **A Volatility**
- B Risk
- C Complexity
- D Ambiguity

SLIDE 90 / 107 **Uncertainty Performance Domain**



NOTES

1. This slide steps back. Whenever you can't say for sure what will happen or what's true, that's **uncertainty**, and the next three terms describe why.
2. Compare them by what's unknown. **Risk**: a specific future event may happen. **Ambiguity**: you aren't sure what the current situation means. **Complexity**: too many interacting parts to predict. Each one needs a different response, which is the reason to separate them.

EXAM ANGLE

Prediction Q1

"We can't tell what this requirement really means right now." Which nuance of uncertainty is this closest to?

A Ambiguity

It's about not being aware of current conditions.

B Quality

Quality isn't a nuance of uncertainty.

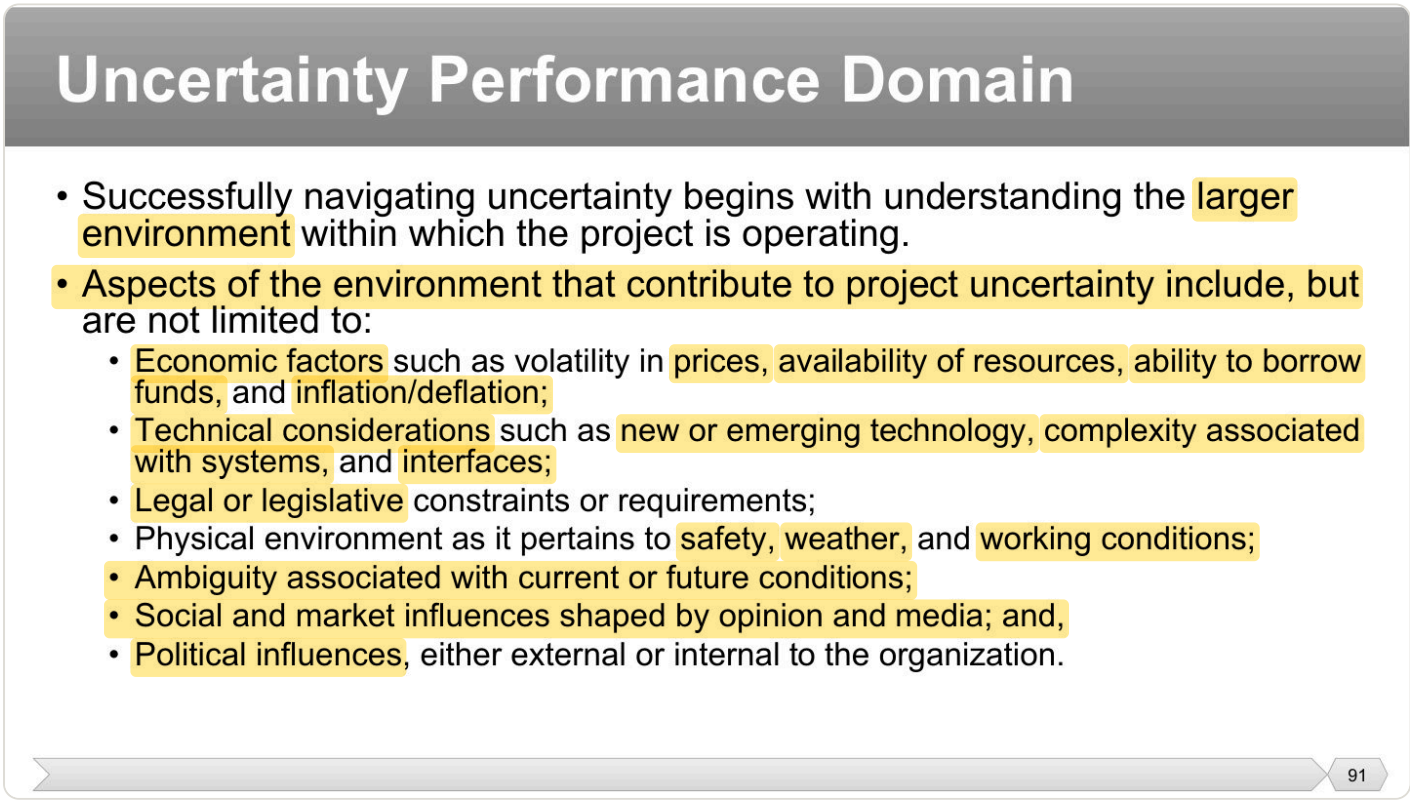
C Complexity

Complexity is about dynamic systems with unpredictable outcomes.

D Risk

Risk is about not knowing a future event.

SLIDE 91 / 107 **Uncertainty Performance Domain**



NOTES

1 Many surprises come from outside the project. You can't respond to what you never looked at, so scanning the **larger environment** comes before responding.

2. Use it as a checklist when asked where uncertainty comes from. **Economic**: costs change. **Technical**: new technology may not work. **Legal**: the rules may change. Each is something the team doesn't control but must plan for.
3. **Political** influences, inside or outside the organization. (A PESTLE-style checklist.)

TIPS & TRICKS

- **PLATE SPinning**: Political, Legal, Ambiguity, Technical, Economic, Social and market, Physical.

EXAM ANGLE

Prediction Q1

A new law may change what the product must do. Which aspect of the environment is this?

A Social and market

That's about opinion and media.

B Technical

That's about new technology and interfaces.

C Physical

That's about safety, weather and working conditions.

D Legal or legislative

It's listed as a contributor to uncertainty.

 Ambiguity

Ambiguity

- There are two categories of ambiguity:
  - Conceptual ambiguity
    - The lack of effective understanding—occurs when people use similar terms or arguments in different ways.
    - For example, the statement, “The schedule was reported on track last week,” is not clear.
    - It isn’t clear whether the schedule was on track last week or whether it was reported on last week.
  - Situational ambiguity
    - Surfaces when more than one outcome is possible.
    - Having multiple options to solve a problem is a form of situational ambiguity.

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NOTES

1. Two people can read the same sentence differently and both feel sure. **Conceptual ambiguity** is fixed by defining terms: agree on what “done” or “on track” means before relying on the word. The slide’s schedule sentence shows how easily it happens.
2. Here the words are clear, but you can’t tell which path will turn out best. With **situational ambiguity**, the way forward is trying options on a small scale or making them comparable, rather than arguing.

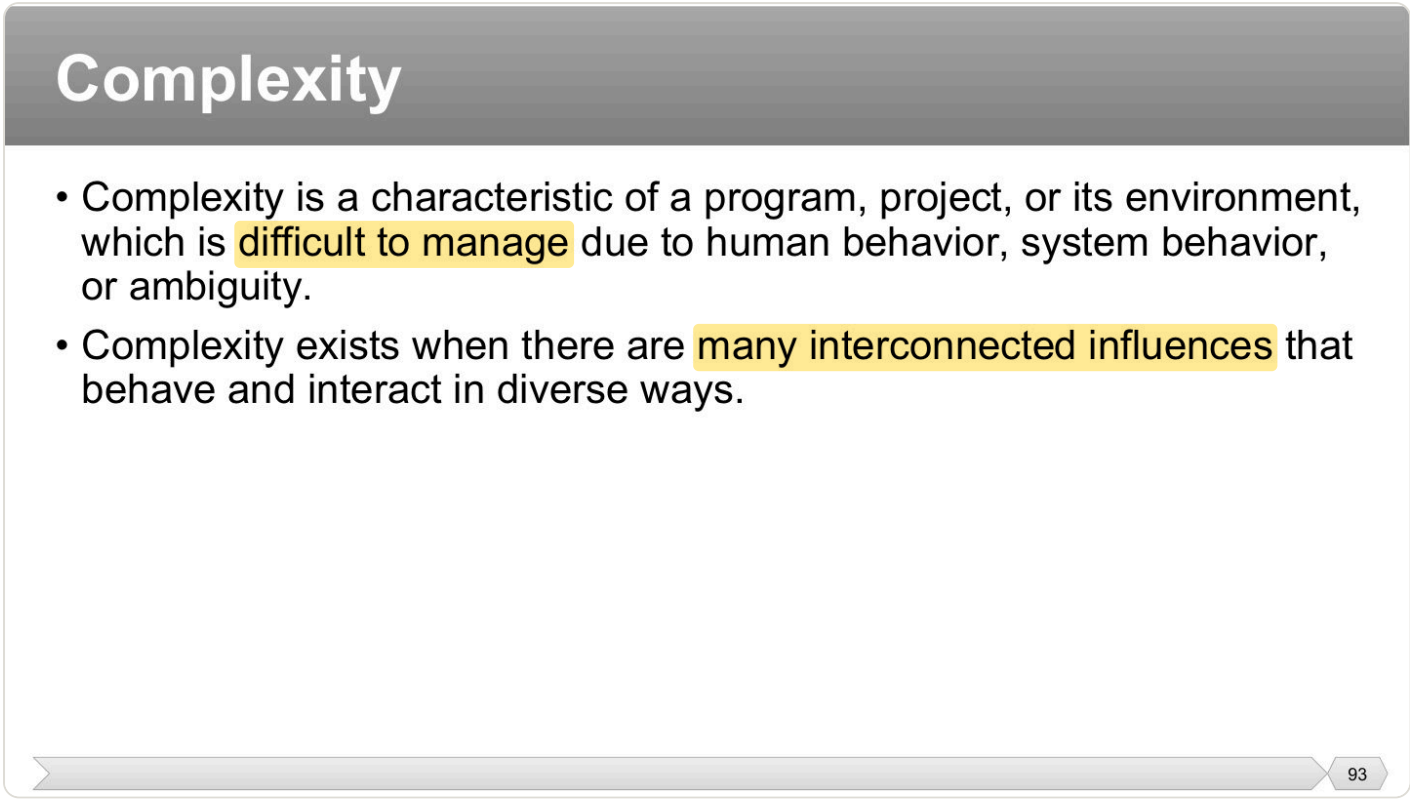
EXAM ANGLE

Prediction Q1

Team members argue in a status meeting because they mean different things by “done”. Which kind of uncertainty is this?

- A **Conceptual ambiguity**
- B A threat
- C Situational ambiguity
- D Volatility

 Complexity



NOTES

1. This isn't about the amount of work. A huge but predictable job can be merely large. **Complexity** comes from people and systems reacting in ways you can't fully foresee.
2. **Interconnected** is the key word: change one thing and others respond, and those responses cause more change. Think of a new policy that makes one department's work easier and creates a backlog in another.

EXAM ANGLE

Prediction Q1

What makes something complex, according to the slide?

A A high budget

> Money doesn't make something complex.

B Simply having a lot of tasks

> A large job can still be predictable.

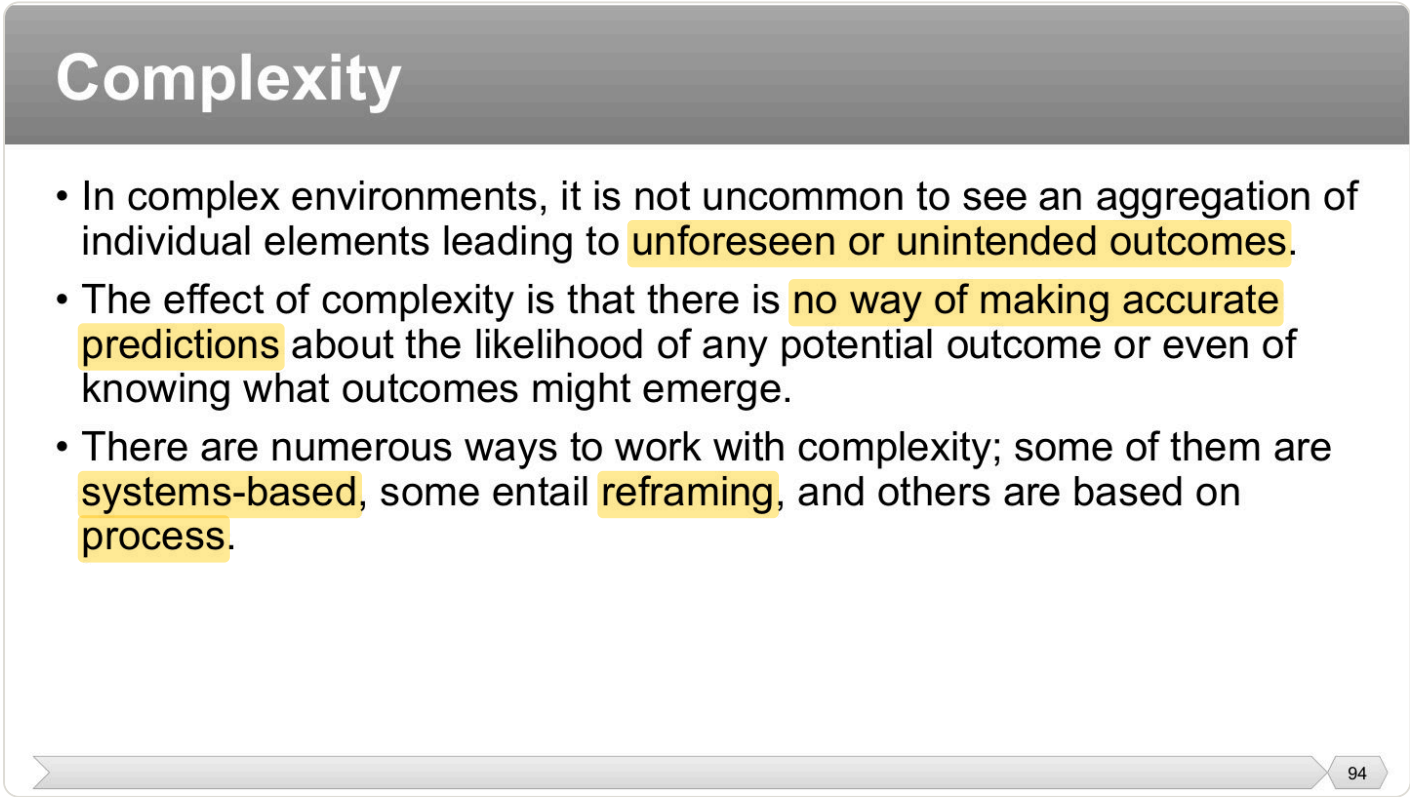
C **Many interconnected influences that interact in diverse ways**

> That's the condition it gives.

D Using a new color scheme

> That has nothing to do with it.

SLIDE 94 / 107 **Complexity**



NOTES

1 The whole can behave differently from its parts. Each person can act sensibly and still produce a traffic jam. That's what **unintended outcomes** means, and it's why testing parts alone doesn't guarantee the whole works.

2 This changes how you should act. Since you **can't predict** results, a detailed long-term plan offers false confidence. Instead, try small steps, watch what happens and adjust.

3 Each family tackles it from another angle: **systems-based** changes the system itself, **reframing** changes how you look at it, and **process-based** changes how you work. Next three slides.

EXAM ANGLE

Prediction Q1

What is the effect of complexity on prediction?

A **You can't accurately predict outcomes, or even know which might emerge**

> That's why plans give false confidence here.

B Prediction is unnecessary in projects

> It's simply unreliable here.

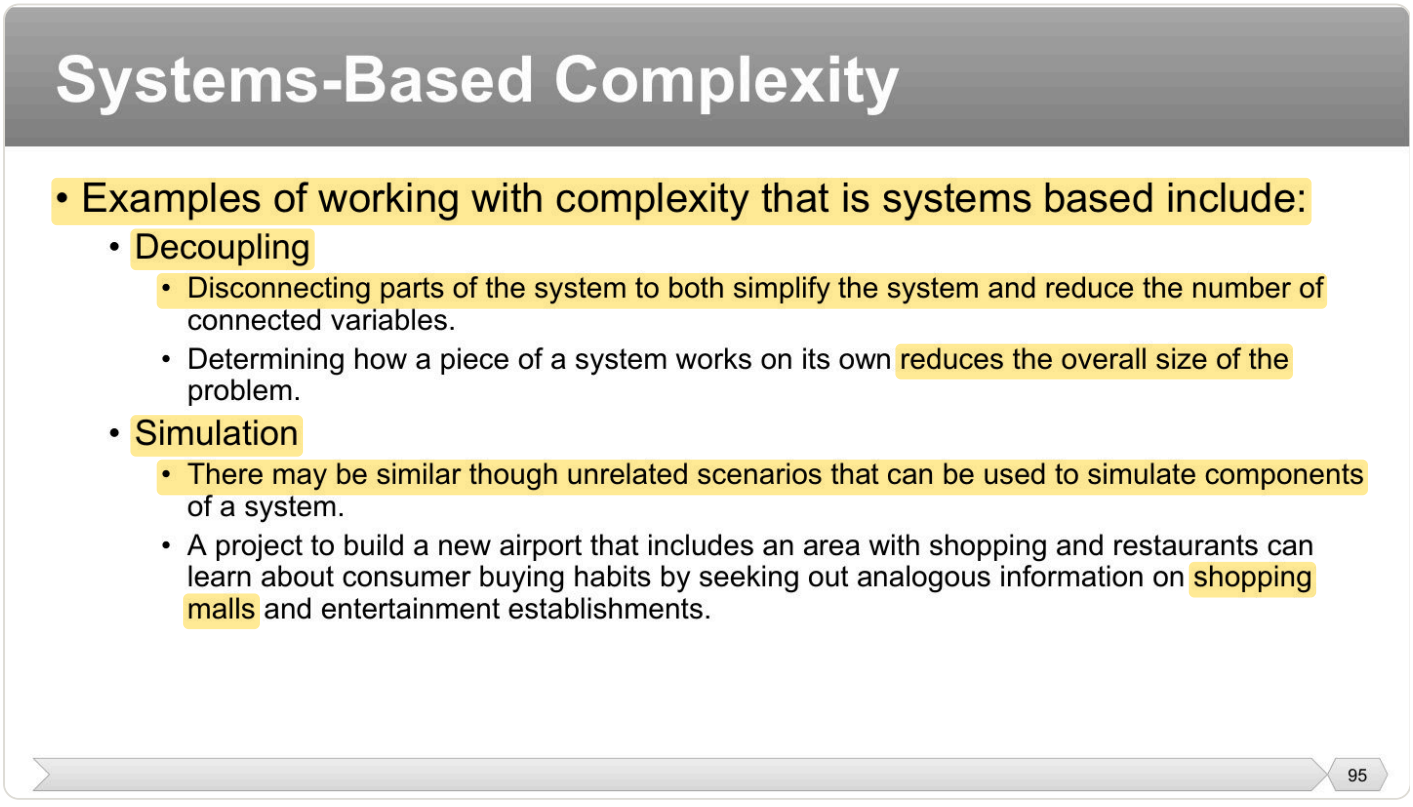
C Predictions become exact

> That's the opposite.

D Only cost can be predicted

> The slide doesn't make that exception.

SLIDE 95 / 107 **Systems-Based Complexity**



NOTES

1. If everything is connected, every change affects everything. **Decoupling** cuts those links so you can work on one piece safely. Software modules with clear interfaces are the familiar example, as you can change one without breaking the rest.

2. When you can't test the real thing, learn from something similar. A **simulation** doesn't have to use the same industry: an airport can learn from **shopping malls** how customers spend, at low cost and before anything's built.

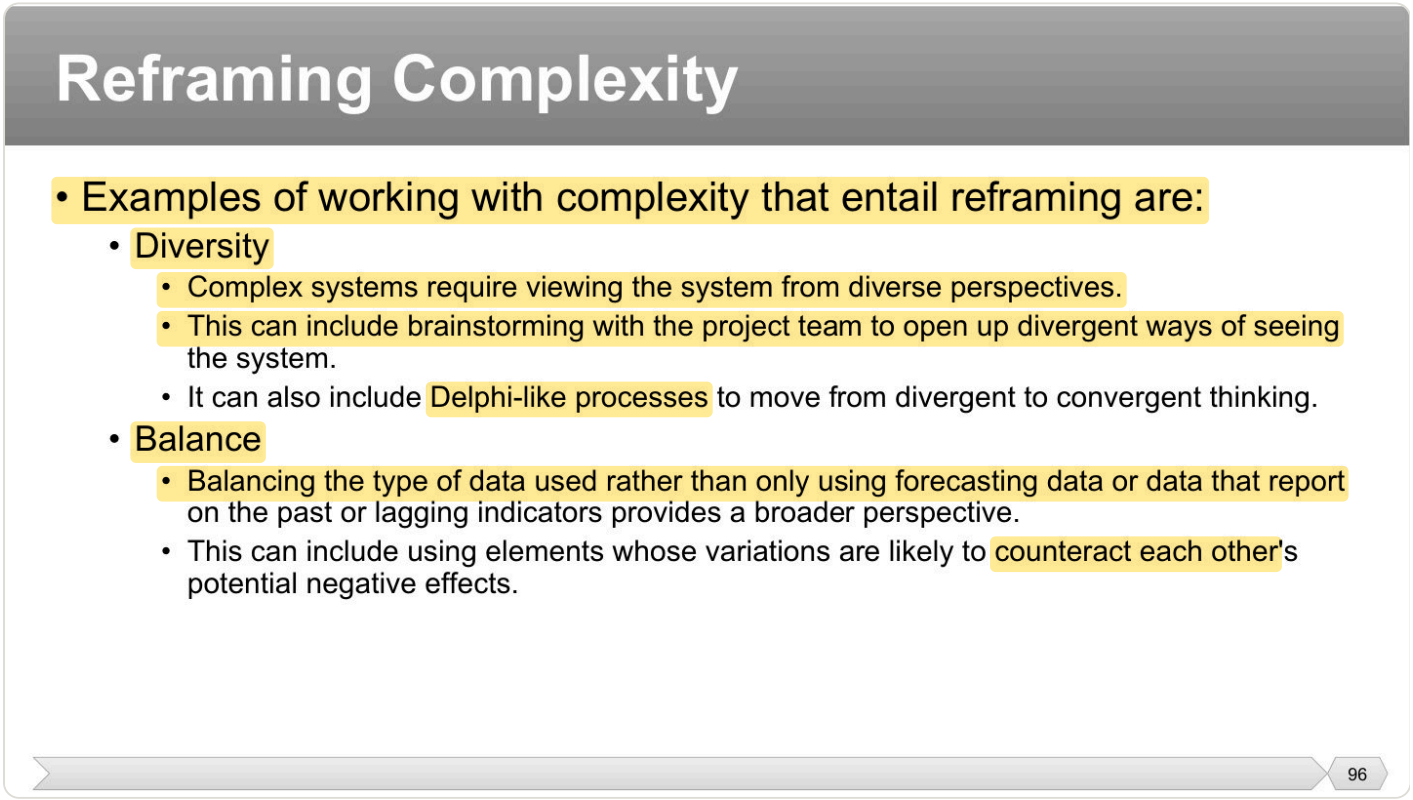
EXAM ANGLE

Prediction Q1

A team designing a new airport's retail area studies shopping malls to predict consumer buying habits. Which complexity technique is this?

- **A** **Simulation**
- **B** Balance
- **C** Decoupling
- **D** Fail safe

SLIDE 96 / 107 **Reframing Complexity**



NOTES

1. One person only sees part of a complex system. **Diversity** brings in other views to uncover what you'd miss. Starting broad and narrowing later keeps you from settling too soon on the first idea. Delphi-like processes then narrow things down.

2. Relying only on past data misses what's coming, and relying only on forecasts ignores what really happened. **Balance** uses both, and the slide's other point is like a hedge: elements that **counteract** each other limit the total damage.

EXAM ANGLE

Prediction

Q1

A team brainstorms many views of a system, then uses a Delphi-like process to narrow them. What is this?

A Fail safe

> Fail safe builds in redundancy.

B Decoupling

> Decoupling disconnects parts of a system.

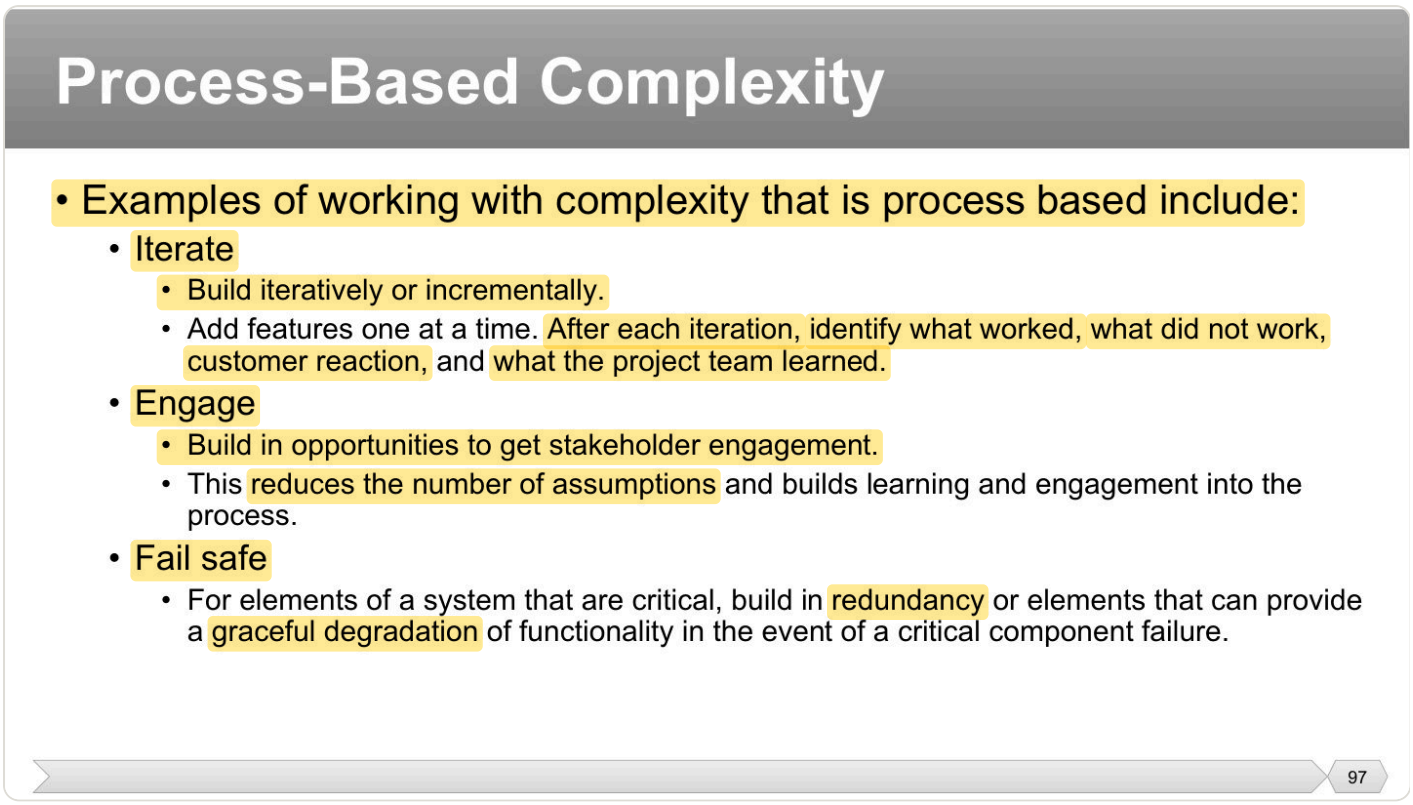
C Resource leveling

> That's a scheduling technique.

D **Diversity, a reframing approach**

> It moves from divergent to convergent thinking.

 Process-Based Complexity



NOTES

1. If you can't predict the result, make small changes and watch. **Iterating** turns a big unknown into many small experiments, and each one tells you what to try next.
2. Assumptions are where complex projects go wrong. Asking stakeholders regularly replaces guesses with facts. **Engaging** them also means they're less likely to be surprised, or to resist the final result.
3. **Fail safe**: for critical elements, build in **redundancy** or **graceful degradation** so a component failure doesn't take the whole system down (a backup server).

TIPS & TRICKS

- **IIFE**: Iterate, Fail safe, Engage.

EXAM ANGLE

Prediction Q1

Adding a backup server so a critical system keeps working in reduced form if its main server fails is which complexity technique?

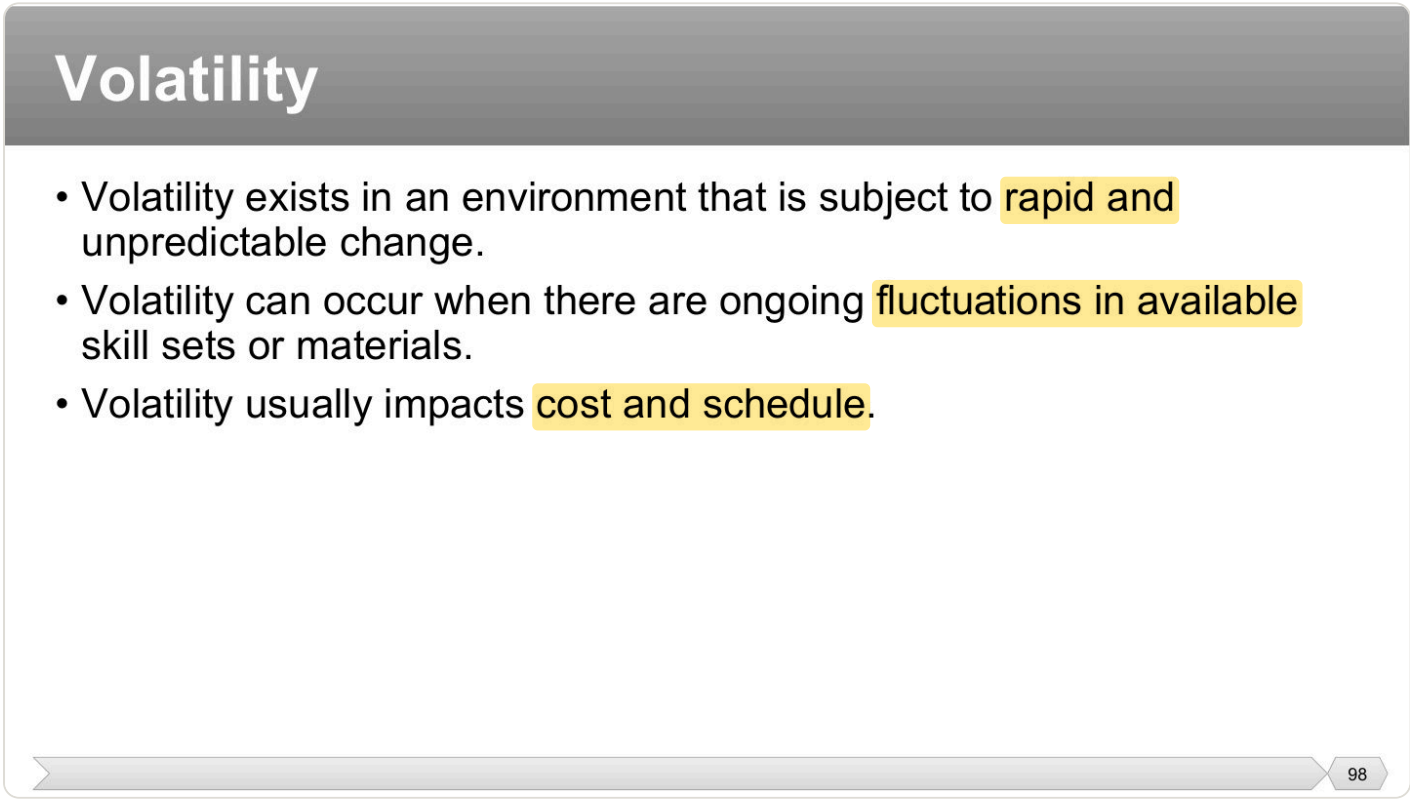
A Decoupling

B Engage

C Iterate

D **Fail safe**

SLIDE 98 / 107 **Volatility**



NOTES

1. Compare it with ambiguity. **Volatility** isn't about being unclear: you may understand a market well, and prices can still jump next week.
2. It often comes from **fluctuations** in available skills or materials (a key specialist leaves; chip prices spike).
3. Sudden shortages and price jumps show up directly as more money or more waiting. So **cost and schedule** are where you plan protection, which is what the next slide covers.

EXAM ANGLE

Prediction Q1

A key specialist unexpectedly leaves, and chip prices jump. What is the project experiencing?

A Scope creep

> The scope hasn’t grown.

B Governance

> That’s about oversight.

C Ambiguity

> Nothing here is unclear in meaning.

D Volatility

> Rapid, unpredictable change in skills or materials is volatility.

Prediction Q2

What does volatility usually affect?

A Only team morale

> That isn’t what it names.

B Only the vision

> That isn’t what it names.

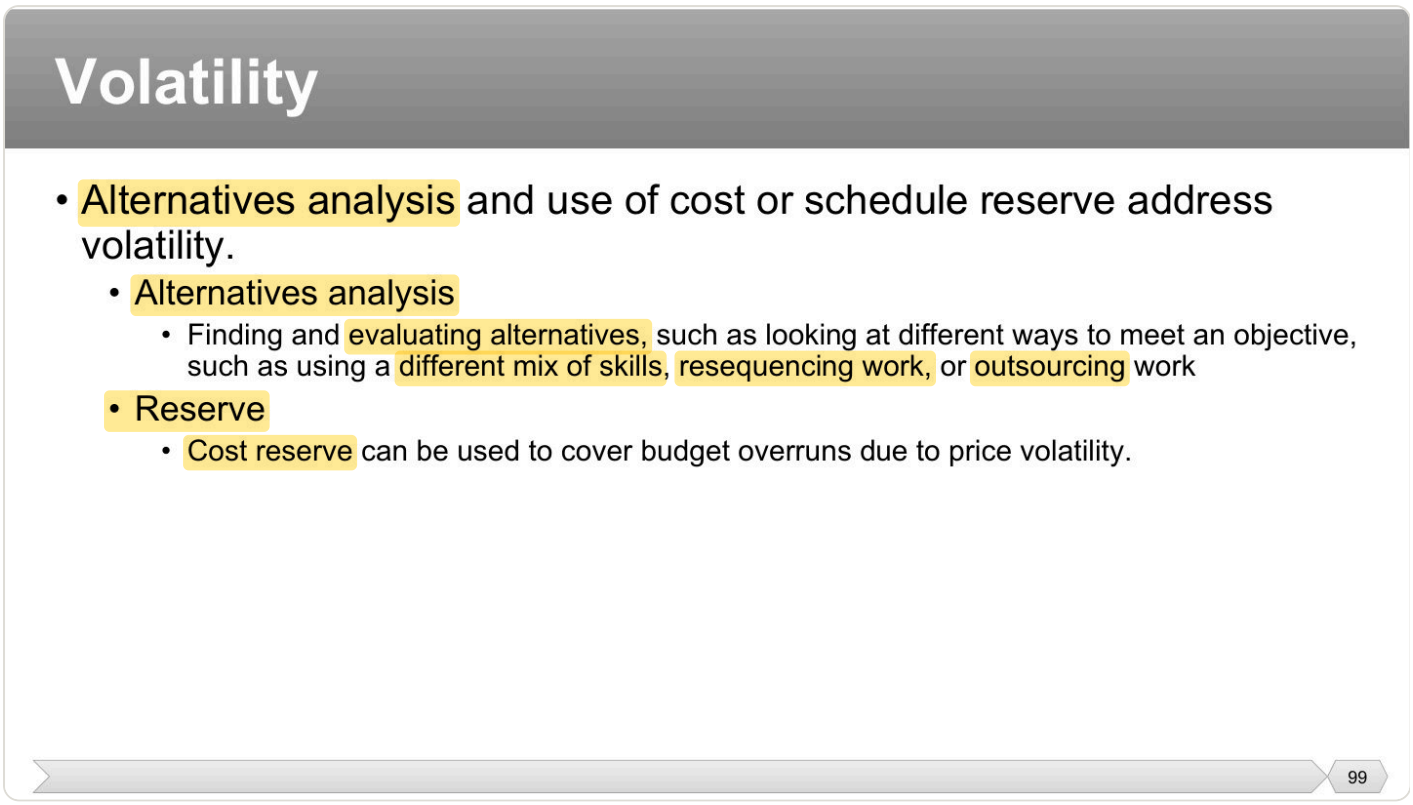
C Nothing measurable

> It shows up as money and time.

D Cost and schedule

> The slide says so.

 Volatility



NOTES

1. You can't stop the changes, so prepare for them with two tools: have other options ready and keep something in reserve. That's why **alternatives analysis** and **reserves** go together.
2. If your one specialist leaves, what then? **Alternatives analysis** answers before it happens: train someone else, reorder the work, or **outsource**. Having options means a shock doesn't stop you.
3. Prices may rise no matter what you do, so a **cost reserve** absorbs the jump without needing a new approval. Without it, every price change would become a crisis.

EXAM ANGLE

Prediction Q1

Prices rise and the budget runs short. Which response fits?

A Stop all reporting

> That only hides the problem.

B Delete the risk register

> That helps nothing.

C Rewrite the project charter

> A charter authorizes, and doesn't cover costs.

D Use the cost reserve

> A cost reserve covers overruns from price volatility.

Prediction Q2

Which is an example of alternatives analysis?

A Holding a team party

> That's team building.

B Comparing a different mix of skills, resequencing or outsourcing

> These are the slide's examples.

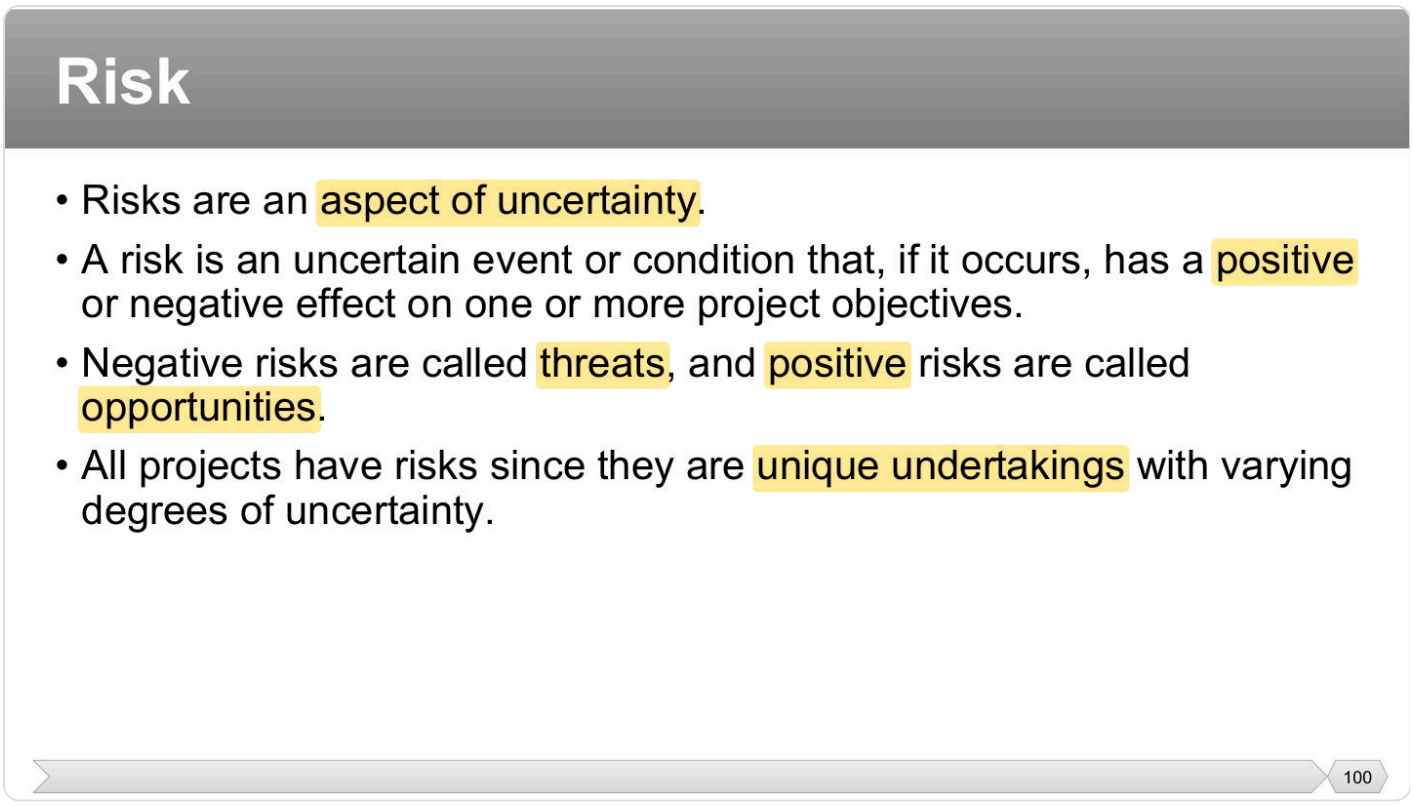
C Choosing not to measure anything

> That doesn't evaluate alternatives.

D Only setting a bigger budget

> That's a reserve.

 Risk



NOTES

1. Uncertainty is the broad state of not knowing. A **risk** is one specific thing you can name, assess and plan a response to, and that's why it's manageable.
2. Two parts make up the definition: it might not happen (uncertain), and if it does, an objective is affected. If it has already happened, it's no longer a risk but an issue. Remember the effect can be **positive**.
3. Separate words help because you act in opposite ways: you try to stop **threats** from happening and try to make **opportunities** happen. Exam questions often turn on that difference.
4. Having never done this exact thing before means you can't know everything in advance. So "no risks" in a plan means that nobody looked, and every project has them because each is **unique**.

EXAM ANGLE

Prediction Q1

A vendor might deliver late. It hasn't happened yet. What is this?

A An issue

> An issue has already happened.

B **A risk (a threat)**

> It's uncertain and would have a negative effect.

C A deliverable

> A deliverable is an output.

D An opportunity

> An opportunity has a positive effect.

Prediction Q2

All projects have risks.

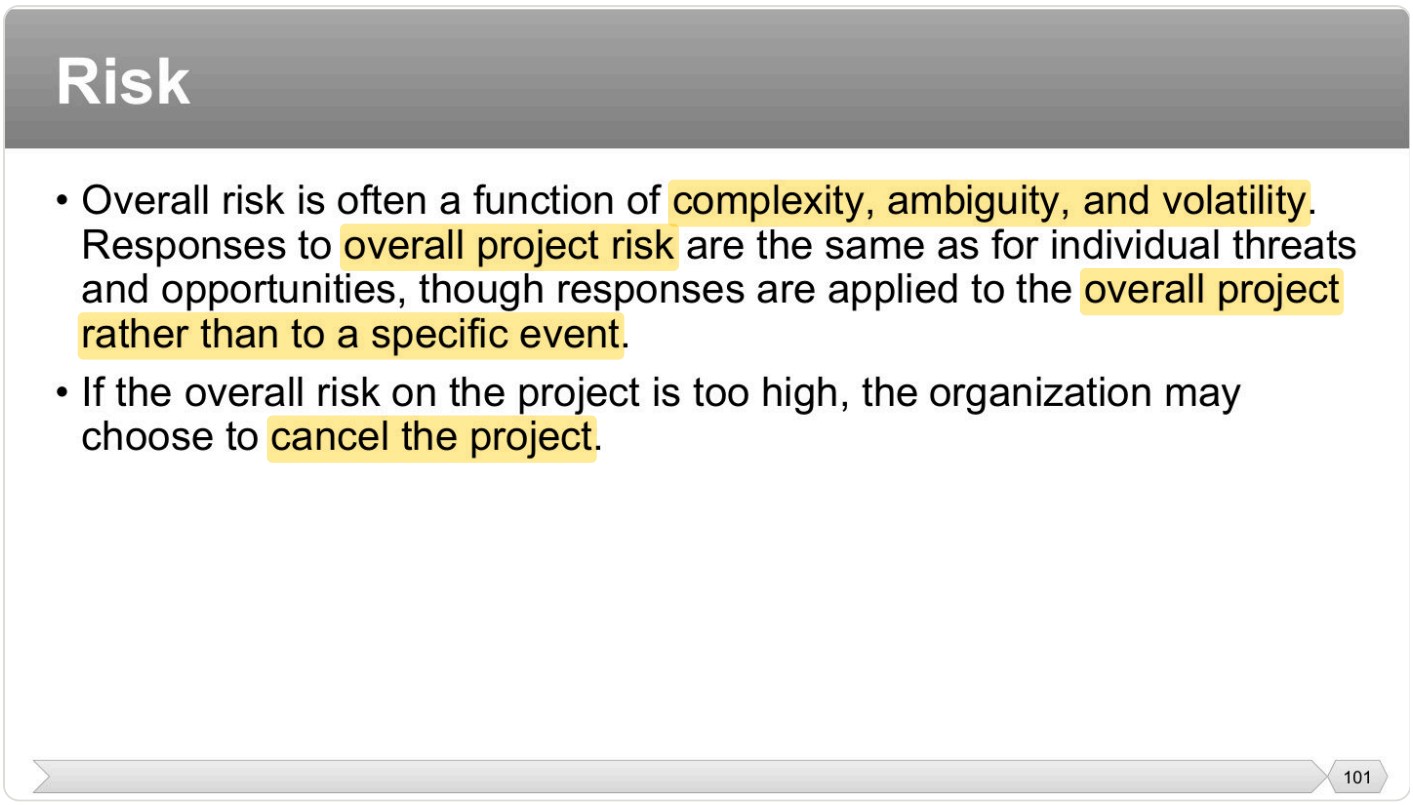
T **True**

> They are unique undertakings with varying uncertainty.

F False

> The slide says all projects have them.

 Risk



NOTES

1. Separate risks can each look fine while the project as a whole is shaky. **Overall project risk** looks at the total picture, and a very complex, unclear, fast-changing project is risky even if no single item stands out.
2. Same toolkit, larger scale. Rather than buying insurance for a single event, you might split a whole project into phases, or partner with another firm to share the **project as a whole**'s exposure.
3. If overall risk is too high, the organization may **cancel** the project: a legitimate outcome, not a failure of risk management.

EXAM ANGLE

Prediction Q1

Overall project risk is often a function of:

A People, process and tools

That's from tailoring.

B **Complexity, ambiguity and volatility**

These are the three the slide names.

C Threats, opportunities and issues

It doesn't name these.

D Budget, scope and schedule

Those are constraints.

Prediction Q2

If overall risk is too high, what may the organization do?

A Remove the risk register

That hides the risk, without reducing it.

B Declare the risk an opportunity

That changes nothing.

C **Cancel the project**

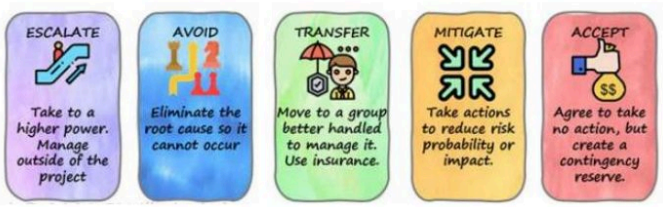
This is a legitimate outcome.

D Ignore it

That isn't responding.

Risk (Threat)

- A threat is an event or condition that, if it occurs, has a negative impact on one or more objectives.
- Five alternative strategies may be considered for dealing with threats, as follows:
  - Avoid
  - Escalate
  - Transfer
  - Mitigate
  - Accept



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NOTES

1. A **threat** is still only a possibility. That's why you have choices about it, including accepting it or preventing it, which you wouldn't have once it has happened.
2. **Avoid**: eliminate the threat or protect the project from it (change the plan, drop the risky feature).
3. **Escalate**: the threat is outside the PM's authority or scope, so pass it to the right level (program, portfolio, sponsor).
4. **Transfer**: shift ownership and impact to a third party (insurance, a fixed-price contract).
5. **Mitigate**: reduce the probability or impact (extra testing, a prototype).
6. **Accept**: acknowledge it without action, perhaps with a contingency reserve.

TIPS & TRICKS

- Threats, the **A TEAM**: Accept, Transfer, Escalate, Avoid, Mitigate.

EXAM ANGLE

Prediction Q1

Buying insurance against a data-centre fire is which threat response strategy?

A Mitigate

B **Transfer**

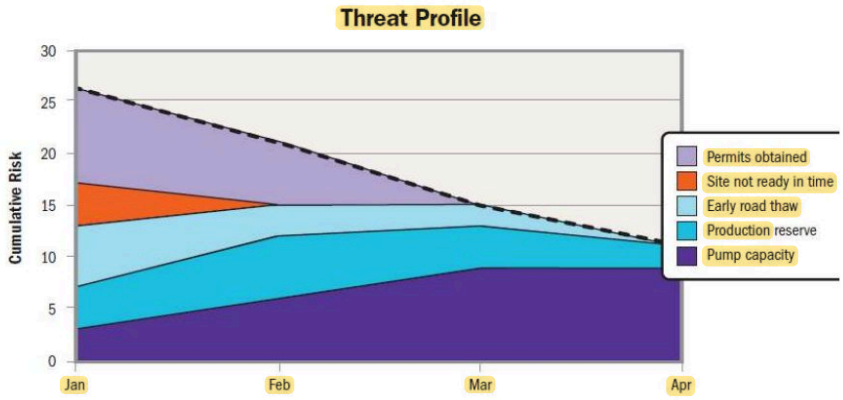
C Avoid

D Exploit

SLIDE 103 / 107 **Risk Reduction over Time**

Risk Reduction over Time

		Jan			Feb			Mar			Apr		
ID	Short Risk Name	Impact	Probability	Severity	Impact	Probability	Severity	Impact	Probability	Severity	Impact	Probability	Severity
1	Permits obtained	3	3	9	3	2	6	3	0	0	3	0	0
2	Site not ready in time	2	2	4	2	0	0	2	0	0	2	0	0
3	Early road thaw	3	2	6	3	1	3	2	1	2	3	0	0
4	Production reserve	2	2	4	2	3	6	2	2	4	2	1	2
5	Pump capacity	3	1	3	3	2	6	3	3	9	3	3	9



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NOTES

1. The table scores five risks each month (impact × probability = severity), and the **threat profile** chart stacks their severities over time. The total (dashed line) falls from about 26 in January to about 11 in April.

2. Some risks disappear as they are dealt with (**permits obtained** drops to 0 once permits are secured; "site not ready in time" too), while "pump capacity" stays. A falling profile is the evidence that risk responses are working.

EXAM ANGLE

Prediction Q1

What does a falling threat profile suggest?

A Risks are being ignored

> Ignoring them wouldn't reduce severity.

B The project budget is rising

> The chart shows risk severity, not budget.

C The team has grown

> Team size isn't shown.

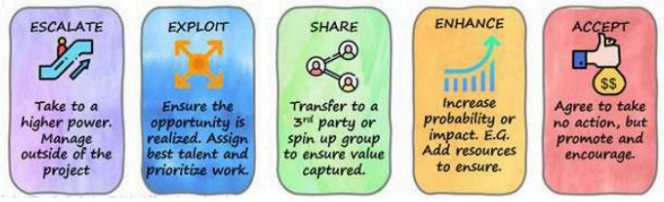
D The risk responses are working

> Total severity is going down over time.

SLIDE 104 / 107 **Risk (Opportunities)**

Risk (Opportunities)

- An opportunity is an event or condition that, if it occurs, has a positive impact on one or more project objectives.
- An example of an opportunity could be a time and materials-based subcontractor who finishes work early, resulting in lower costs and schedule savings.
- Five alternative strategies may be considered for dealing with opportunities, as follows:
  - Exploit
  - Escalate
  - Share
  - Enhance
  - Accept



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NOTES

1 Same event logic as a threat, but here you want it to happen. Since an **opportunity** can be missed, ignoring one has a cost too, so it deserves as much attention as a threat.

2. Finishing early sounds like simple luck, but a PM should plan for it. Under a time-and-materials contract, you pay for hours worked, so an early finish **saves money** directly, which can be reused elsewhere.
3. **Exploit**: act to make sure the opportunity **happens** (raise its probability to 100%).
4. **Share**: give part of the ownership to a third party better able to capture the benefit (a partnership).
5. The difference from exploit is the guarantee. **Enhance** improves the odds or the size, such as adding staff to raise the chance of finishing early, without promising it. **Escalate** and **accept** apply to opportunities too.

TIPS & TRICKS

- Opportunities, in slide order: **E**ach **E**xtra **S**hare **E**arns **A**gain. Exploit, Escalate, Share, Enhance, Accept.

EXAM ANGLE

Past exam · Midterm 261 · MCQ — Q1

A team identifies a chance to finish early and takes action to ensure that the opportunity occurs. Which strategy is this?

- **A Exploit**

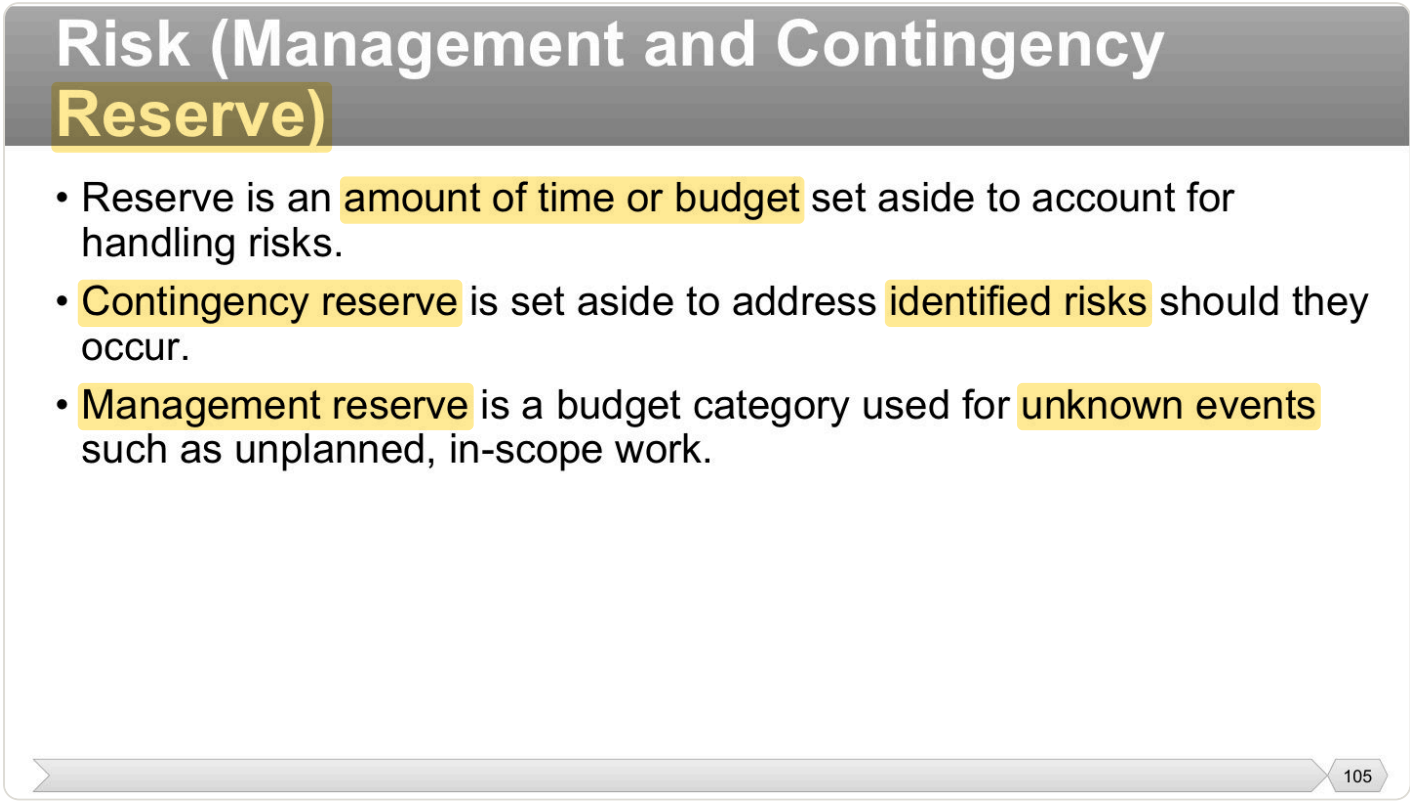
> Exploit makes sure the opportunity happens. Enhance only increases its chance; transfer is a threat strategy.

- B Transfer
- C Enhance
- D Accept

Prediction — Q2

A firm partners with another company so that both can capture a positive risk neither could capture alone. Which opportunity strategy is this?

- A Transfer
- B Enhance
- **C Share**
- D Exploit



NOTES

1. Reserves are a planned cushion, not padding. Being explicit means people can see what's there for risk and track how it's used, instead of hiding extra days in every task.
2. You've named the risk and estimated the possible hit, so this is planned money. Since it's tied to **identified** risks, it's normally part of the cost baseline and the PM can use it.
3. Nobody can name these events yet, so you can't assign the money to specific risks. **Management reserve** stays outside the baseline, and using it takes approval (see slide 47).

EXAM ANGLE

Prediction Q1

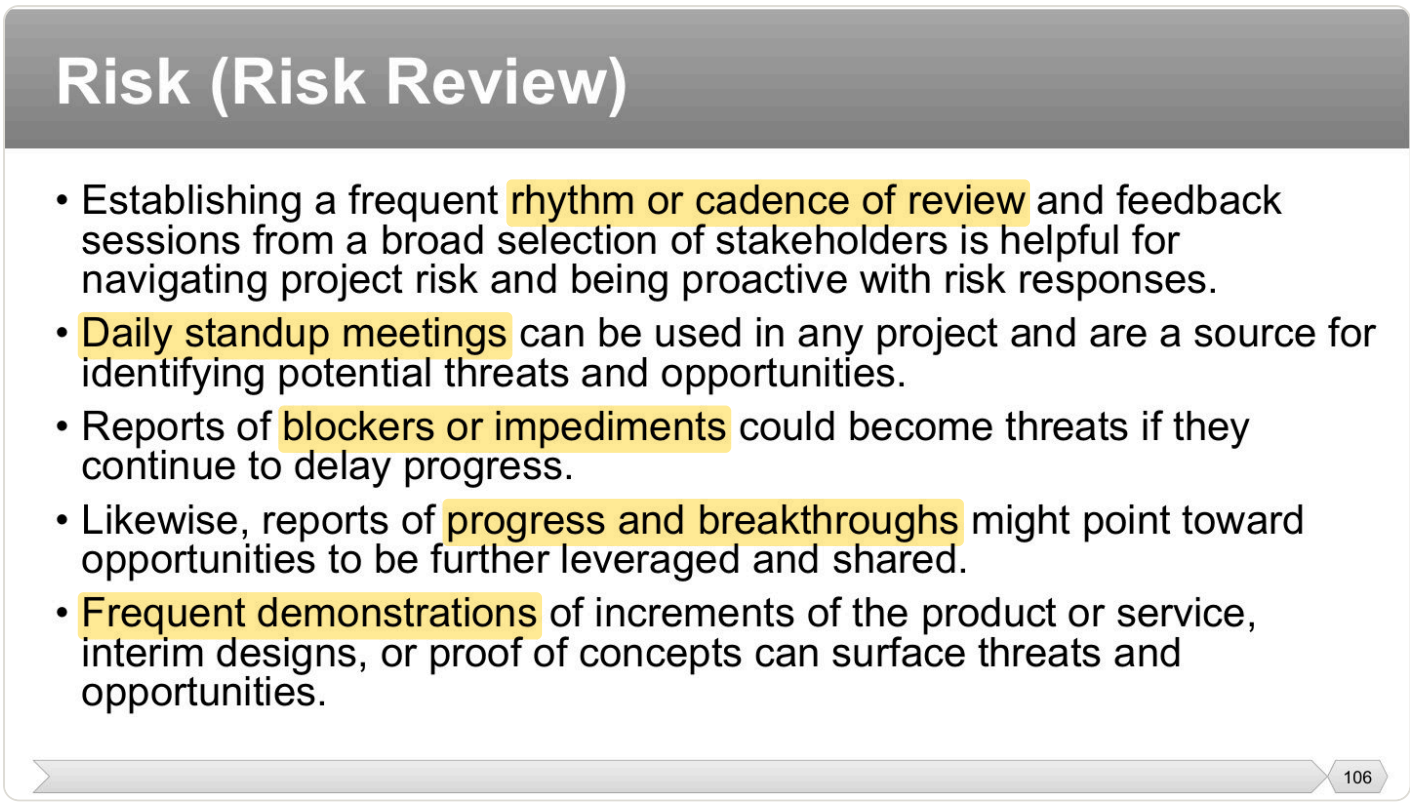
True or false: contingency reserve is set aside for unknown, unplanned events.

T True

F **False**

Contingency reserve covers identified risks; management reserve covers unknown events.

 Risk (Risk Review)



NOTES

1. Risks change as a project moves, so a list written once goes stale. A regular **cadence** catches new ones, and more varied people mean more chance someone spots what others can't see.
2. Nobody has to run a separate risk meeting for this. **Daily stand-ups** already ask what's blocking people, which is where threats first appear, while they're still small.
3. A small delay today can become a missed milestone if it continues. A **blocker** is a threat in its early form, so treat a repeat report as a warning, not just an update.
4. Good news deserves a follow-up too. If a team finds a faster method, could another team use it? A **breakthrough** is an opportunity only if someone notices and acts on it.
5. People react differently to something real than to a description. Showing a working piece early with a **demonstration** makes misunderstandings visible while they're still cheap to fix.

EXAM ANGLE

Prediction Q1

A blocker keeps being reported at daily stand-up. What might it become?

A **A threat, if it continues to delay progress**

That's the slide's warning.

B An opportunity automatically

Delay isn't a benefit.

C A deliverable

A blocker isn't an output.

D A management reserve

That's a budget category.

Prediction Q2

A team finds a much faster testing method. What should it consider?

A Treating it as a threat

It has a positive effect.

B Hiding it from other teams

That wastes the benefit.

C Cancelling the project

Good news isn't a reason to cancel.

D **Whether it's an opportunity to exploit and share**

Breakthroughs may point to opportunities.

Checking Outcomes: Uncertainty

Outcome	Check
An awareness of the environment in which projects occur, including, but not limited to, the technical, social, political, market, and economic environments	The team incorporates environmental considerations when evaluating uncertainty, risks, and responses.
Proactively exploring and responding to uncertainty	Risk responses are aligned with the prioritization of project constraints, such as budget, schedule, and performance.
An awareness of the interdependence of multiple variables on the project	Actions to address complexity, ambiguity, and volatility are appropriate for the project.
The capacity to anticipate threats and opportunities and understand the consequences of issues	Systems for identifying, capturing, and responding to risk are appropriately robust.
Project delivery with little or no negative impact from unforeseen events or conditions	Scheduled delivery dates are met, and the budget performance is within the variance threshold.
Realized opportunities to improve project performance and outcomes	Teams use established mechanisms to identify and leverage opportunities.
Cost and schedule reserves used effectively to maintain alignment with project objectives	Teams take steps to proactively prevent threats, thereby limiting use of cost or schedule reserve.

NOTES

1 The “checking outcomes” table: the left column is what success looks like for the domain, the right column is the evidence that it happened. You won’t be asked to reproduce it, but it is a good structure for a written answer about the domain. Uncertainty: awareness of the environment (environmental factors considered in estimates and plans), proactive responses (risk register and responses kept current), awareness of interdependencies, anticipation of threats and opportunities, little impact from surprises, realized opportunities, and effective use of reserves.

EXAM ANGLE

Prediction

Q1

Which evidence supports “proactive responses” in the Uncertainty domain?

A A register written once and never updated

> That isn’t current.

B **A risk register and responses that are kept current**

> That’s what the table checks.

C No reserves at all

> Reserves are part of the response.

D Waiting until a risk happens

> That’s reactive.

Original slides from the SE423 lecture deck, with study notes. Check exact wording against the original deck.
Notes and questions are study aids. Made by Shoug Alomran.