m's Policy ber/ No Al No Al No Al No Al	Students Action Students articulate concepts in their own words without AI assistance Use conceptual understanding to reason through problems and explain which problems and why, not just executing procedures Examine concepts systematically using provided frameworks to identify assumptions, limitations, rikay differences between approaches	Rationale Initial encoding into long-term memory requires students to would by pass the cognitive would by pass the cognitive work redeed to form foundational mental models on the control of the contr	Al for worked examples	Student Action Explain concept in own words, then compare with Algenerated explanations to identify what elements they included vs missed After attempting problems independently, use Al to see alternative approaches or additional worked examples of the same concept. Conduct analysis	Rationale Students have basic grasp but need to deepen understanding by explanations include; comparing helps sidently gaps without requiring evaluation of Al's correctness Students are building pattern recognition for when/how concepts apply, seeing varied examples helps develop this nitrition without requiring them to evaluate correctness	Policy Al for verification Al for critical feedback	Student Action Explain concept independently, then engage with Al feedback critically to accept useful corrections and reject incorrect suggestions. Apply concepts independently, then engage with Al feedback critically, strengthen reasoning and which reflect Al misunderstanding	Rationale Students have developed enough judgment to evidence along the students and technic quality and distinguish good corrections from hallucinations Competent students can evaluate conceptual reasoning quality, critically metacondrive skills while preventing	Policy N/A Al as collaborative partner	Student Action N/A Use Al collaboratively throughout the application process, resting approaches, exploring alternatives, and refining	and explanation; assessment focuses on application and analysis rather than foundational understanding Proficient students have internalized when/how concepts apply; Al accelerates
No Al No Al	own words without Al assistance Use conceptual understanding to reason through problems and explain which principles apply and why, not just executing procedures Examine concepts systematically using provided frameworks to identify assumptions, limitations, or key differences between	memory requires students to struggle with articulation. Al would bypass the cognitive work needed to live of foundational mental models Novices must build the mental connection between abstract applications, using Al principles and concrete applications, using Al which concepts are relevant Novices need scaffolded practice in analytical thinking, structured frameworks help them iteam host of the presence of the mental most one with a structured frameworks help them iteam host opps without Al bypassing the development of analytical	Al for worked examples	then compare with Al- generated explanations to identify what elements they included vs missed After attempting problems independently, use Al to see alternative approaches or showing different applications of the same concept.	need to deepen understanding by seeing what complete explanations include; comparing helps identify agree without requiring evaluation of Al's correctness: Students are building pattern recognition for when/how concepts apply, seeing varied examples helps develop this studies without a variety and studies without a variety and studies without a variety studies without a variety studies without a variety studies without a variety studies without a variety studies without studies correctness	verification Al for critical	engage with Al feedback critically to accept useful corrections and reject incorrect suggestions Apply concepts independently, then engage with Al feedback critically, evaluating which suggestions strengthen reasoning and which reflect	judgment to evaluate AI feedback quality and distinguish good corrections from hallucinations Competent students can evaluate conceptual reasoning quality; critically engaging with AI develops	Al as collaborative	Use Al collaboratively throughout the application process, testing approaches,	application and analysis rather than foundational understanding Proficient students have internalized when/how concepts apply; Al accelerates
	reason through problems and explain which principles apply and why, not just executing procedures Examine concepts systematically using provided frameworks to identify assumptions, limitations, or key differences between	connection between abstract principles and concrete applications; using AI prevents them from developing the pattern recognition needed to identify which concepts are relevant Novices need scaffolded practice in analytical thinking; structured frameworks help them learn how to deconstruct concepts without AI bypassing the development of analytical	examples Al for	independently, use AI to see alternative approaches or additional worked examples showing different applications of the same concept	recognition for when/how concepts apply; seeing varied examples helps develop this intuition without requiring them to evaluate correctness		engage with AI feedback critically, evaluating which suggestions strengthen reasoning and which reflect	conceptual reasoning quality; critically engaging with AI develops	collaborative	application process, testing approaches,	when/how concepts apply; Al accelerates
e No Al	using provided frameworks to identify assumptions, limitations, or key differences between	practice in analytical thinking, structured frameworks help them learn how to deconstruct concepts without Al bypassing the development of analytical						over-reliance	-	exploring alternatives, and renning conceptual reasoning	execution while they focus on sophisticated problem selection, approach refinement, and result interpretation
		reasoning patterns	comparison	independently using learned frameworks, then compare their reasoning with Al-generated analysis to identify what they considered vs missed	Students can execute analytical processes but benefit from seeing comprehensive analyses; comparing helps them recognize gaps in their analytical approach without requiring evaluation of correctness	Al for critique	Complete analysis independently, then use Al to explore alternative analytical angles, evaluating which deepen understanding and which are tangential or flawed	Competent students can judge analytical quality and relevance; critically evaluating Al's analysis strengthens their ability to distinguish meaningful insights from superficial or erroneous reasoning	Al as analytical partner	Work with AI throughout analysis to efficiently test multiple analytical approaches, explore edge cases, and develop comprehensive multi-dimensional arguments	Proficient students have internalized analytical frameworks and can direct Al productively; focus shifts to efficiency in exploring complex analytical spaces and developing nuanced arguments
No Al	Execute procedures manually, documenting each step and explaining what is being calculated at each stage	Building procedural fluency requires manual practice where students connect actions to outcomes. Al would bypass the cognitive encoding needed to develop automaticity and error recognition	Al for comparison	Execute procedures showing all work, then compare their step-by-step approach with Algenerated solutions to identify where their method differs	Students can execute procedures but need to see complete worked examples; comparing helps them recognize where they deviated without requiring them to evaluate which approach is correct	Al for verification	Execute procedures independently, then use AI to verify results and identify any errors in their execution, critically evaluating AI's feedback	Competent students can execute procedures reliably and can evaluate procedural corrections; using Al for verification develops error-detection skills while maintaining procedural fluency	Al for computation	Focus on problem formulation and interpretation; use At to execute established procedures they be demonstrated maskery of while maintaining responsibility for validating reasonableness	Proficient students have internalized procedural execution; cognitive effort is better spent on problem formulation, method selection, and vadidating results than on manual computation
e No Al	Use provided criteria or frameworks to select appropriate procedures and check solution reasonableness	Novices learning analytical thinking about procedures need structured guidance; they must develop judgment about method selection and validation without AI making these decisions for them	Al for comparison	Select procedures and validate results independently using learned frameworks, then compare their reasoning with Al-generated analysis to identify considerations they missed	Students can apply analytical frameworks but benefit from seeing comprehensive decision-making processes; comparing helps them recognize factors they overlooked without requiring evaluation of Al's correctness	Al for critique	Select procedures and validate results independently, then engage with Al's suggestions for alternative methods or validation strategies - evaluating which offer better efficiency, accuracy, or insight and which are unsuitable for the problem context	Competent students can judge the quality of procedural decisions: critically evaluating ATs suggestions about method selection strengthens their ability to distinguish efficient approaches from suboptimal ones	Al as analytical partner	Work with Al throughout the analytical process to rapidly compare procedural approaches, assess their appropriateness or problem constrains, and validate results through multiple lenses (analytical, numerical, physical reasonableness)	Proficient students have internalized when procedures apply and now to validate them; Al accelerates exportant or method tradeoffs and validation approaches in sophisticated problem contexts.
No Al	Translate design requirements into solutions using provided guidelines, explaining how each design choice addresses the specifications	Novices must learn how to translate requirements into design decisions; Al would bypass the foundational skill of structured design thinking and decision-making	Al for design exploration	Create initial designs independently, then use AI to explore additional design approaches or identify relevant components/techniques they hadn't considered	Students are developing design thinking but may have limited exposure to possibilities; Al expands their awareness of approaches without requiring evaluation of which designs are better	Al for design critique	Create complete designs independently, then use Al to challenge design decisions and explore alternatives - critically evaluating which suggestions strengthen the solution and which are impractical or miss key constraints	Competent students can judge design qualify and feasibility: critically evaluating ATs design suggestions strengthens their ability to assess tradeoffs and identify flawed reasoning	Al as design partner	Work with Al throughout the design process to efficiently generate and test multiple design concepts, navigate competing constraints, and develop innovative solutions to complex open-ended problems	Proficient students have internalized design thinking and can direct Al productively. focus shifts to efficiently navigating complex design spaces and developing sophisticated solutions
	Systematically analyze given work using provided approaches to identify errors and explain the causal connection between the error and observed behavior	Novices must develop systematic debugging skills and causal reasoning; Al would bypass the analytical thinking needed to connect symptoms to root causes	Al for comparison	Analyze given work independently, then compare their diagnosis with Al- generated analysis to identify differences in their reasoning process or errors they didn't consider	Students can conduct systematic debugging but benefit from seeing complete analytical processes; comparing helps them recognize additional factors to consider without requiring evaluation of which diagnosis is correct	Al for verification	Complete analysis independently, then use Al to challenge their diagnosis and explore alternative explanations - critically evaluating which analyses better explain the observed behavior and which miss key evidence	Competent students can judge the quality of debugging reasoning; critically evaluating Al's alternative analyses strengthens their ability to assess which explanations are better supported by evidence	Al as analytical partner	Collaborate with Al throughout debugging to efficiently test multiple hypotheses, analyze complex multi-component systems, and diagnose subtle interactions or intermittent failures	Proficient students have internalized debugging strategies and can direct Al productively; focus shifts to efficiently diagnosing complex problems with multiple potential causes or hard-to-reproduce issues
te No Al	Use provided criteria to evaluate solutions or designs, identifying strengths and weaknesses based on given standards	Novices must learn how to apply evaluation criteria systematically; Al would bypass the development of judgment skills needed to assess quality against specifications	Al for comparison	Evaluate solutions or designs independently using learned criteria, then compare their assessment with Al-generated evaluation to identify additional quality factors or tradeoffs they hadn't examined	Students can apply evaluation criteria but benefit from seeing comprehensive assessments; comparing helps them recognize additional quality factors without requiring them to judge which evaluation is better	Al for critique	Complete evaluation independently, then use AI to challenge their assessment and explore alternative quality criteria or priorities - critically evaluating which critiques reveal genuine issues and which reflect misunderstanding of requirements or constraints	Competent students can judge evaluation quality and relevance; critically assessing Al's critiques strengthens their ability to distinguish meaningful insights from superficial or context-inappropriate feedback	Al as evaluation partner	Collaborate with Al throughout evaluation to efficiently assess solutions across multiple quality dimensions, analyze tradeoffs between competing approaches, and synthesize findings into actionable recommendations	Proficient students have internalized evaluation frameworks and can direct Al productively, focus shifts to efficiently conducting multi-faceted evaluations and synthesizing insights across multiple quality dimensions
e e	No Al No Al No Al	No Al documenting each step and very explaining what is being calculated at each stage No Al Use provided criteria or frameworks to select appropriate procedures and check solution reasonableness and check solution suing provided quidelines, speaking how each design choice addresses the specifications Systematically analyze given work using provided approaches to using consideration between the error and observed behavior. No Al Use provided criteria to evaluate solutions or designs: identifying strengths and weaknesses based on given standards	No Al	No AI Execute procedures manually, where students connect comparison devaluating what is being calculated by pass the cognitive comparison at each stage AI for comparison at each stage	Execute procedures manually, and commenting each step and explaining what is being calculated at each stage All for comparison explaining where the explaining what is being calculated by pass the cognitive excording needed to develop and environments of the explaining and procedures and check solution reasonableness of the explaining about procedures and check solution reasonableness of the explaining about procedures and check solution reasonableness of the explaining about procedures and check solution reasonableness of the explaining how and environments into the explaining how and feeting check and the explaining how and feeting check and decision-making addresses the specifications No All	No AI Execute procedures manually, where students connect actions to outcomes, at A would explaning what is being calculated bypass the cognitive and explaning what is being calculated bypass the cognitive and explaning what is being calculated bypass the cognitive and explaning what is being calculated bypass the cognitive where their method differs where their method differs which approach is correct. No AI Select procedures and validate training about procedures to select appropriate procedures and check solution reasonableness and check solution saving provided guidelines, and check solutions are design check solutions and design check solutions are designs, itentify the solution solutions and check solutions are designs, it	No AI	Execute procedures manually, where students connect countering each step and explaining what is being calculated at each stage No AI No AI Translate design requirements into solutions substitions sign provided guidentees, and center of substitions sign provided design thinking and center of substitions using provided design thinking and center of substitions using provided design thinking and center of substitions using provided design thinking and decision-making No AI No AI Systematically analyze given work using provided criteria to evaluate solutions or designs, identify earned design thinking and decision-making and decision-making and substitions using provided design thinking and decision-making and decision-making and substitions using provided guidelines, elegation the comparison of the substition as using provided guidelines, substitions using provided guidelines, and decision-making and decision-making and decision-making and decision-making and decision-making and substitions using provided guidelines, and the substition as using provided guidelines, and decision-making a	Execute procedures independently, the content students connect decisions while a being calculated and explaining what is an explaining what is a	Execute procedures manually, concerning each size of concerning and	Execute procedures manually, and restricted contract and subtract to consider a settle year of the students for contract and subtract to consider the students of the students