

CROSS CURRICULAR NUMERACY LEARNING PROGRESSIONS – GRADE LEVEL PROFICIENCY DESCRIPTORS

Aspect	Sub-aspect	K	1	2	3	4	5	6	7	8	9	10	11	12
Interprets <i>Accesses and identifies relevant information in order to understand the real-world problem to be solved</i>	Understands the real-world problem <i>Makes connections to a problem to aid understanding</i>	Makes a personal connection with one aspect of the problem personal connection: <i>experiences and prior knowledge</i>	Makes personal connections with aspects of the problem personal connection: <i>experiences and prior knowledge</i>	Makes personal connections to explore the problem personal connection: <i>experiences and prior knowledge</i>	Makes personal connections to explore the problem personal connection: <i>experiences and prior knowledge</i>	Makes general connections to understand the problem in context general connection: <i>personal, or to similar problems</i>	Makes general connections to understand the problem in context general connection: <i>personal, or to similar problems</i>	Makes relevant connections to understand a real-world problem real-world problem: <i>contextual, relevant, related to current learning, personally/locally/globally meaningful</i>	Makes relevant connections to understand a real-world problem real-world problem: <i>contextual, relevant, related to current learning, personally/locally/globally meaningful</i>	Makes relevant connections to fully understand the real-world problem in context real-world problem: <i>contextual, relevant, related to current learning, personally/locally/globally meaningful</i>	Makes relevant connections to fully understand the real-world problem in context real-world problem: <i>contextual, relevant, related to current learning, personally/locally/globally meaningful</i>	Makes connections necessary to understand the context and implications of the real-world problem real-world problem: <i>contextual, relevant, related to current learning, personally/locally/globally meaningful</i>	Makes connections necessary to investigate and understand new contexts and implications of real-world problems real-world problem: <i>contextual, relevant, related to current learning, personally/locally/globally meaningful</i>	Makes connections necessary to investigate and understand new contexts and implications of real-world problems real-world problem: <i>contextual, relevant, related to current learning, personally/locally/globally meaningful</i>
	Extracts relevant information <i>Extracts key information, data, facts in order to solve a problem</i>	Identifies a significant fact about the problem	Identifies a significant fact and gathers other information from the problem	Identifies and gathers most of the significant information from the presented problem to assist in solving it	Identifies and gathers most of the significant information from the presented problem to assist in solving it	Gathers relevant information from the presented problem to assist in solving it	Gathers relevant information from the presented problem to assist in solving it	Extracts relevant information from the presented problem as needed to solve it	Extracts relevant information from the presented problem as needed to solve it	Extracts relevant information from the presented problem and other resources as needed to solve the problem	Extracts relevant information from the presented problem and other resources as needed to solve the problem	Extracts and organizes relevant information from the presented problem and a variety of other external resources to solve the problem	Extracts and organizes relevant information from the presented problem and a variety of other external resources to solve the problem	Extracts and organizes relevant information from the presented problem and a variety of other external resources to solve the problem
	Identifies parameters and limitations <i>Recognizes reasonable factors, conditions, limitations that define the problem</i>	Understands that problems have parameters parameters: <i>factors and conditions that define the problem</i>	Identifies a clearly defined parameter needed to solve the problem parameters: <i>factors and conditions that define the problem</i>	Identifies some of the clearly defined parameters needed to solve the problem parameters: <i>factors and conditions that define the problem</i>	Identifies most of the clearly defined parameters needed to solve the problem parameters: <i>factors and conditions that define the problem</i>	Identifies all clearly defined parameters needed to solve the problem parameters: <i>factors and conditions that define the problem</i>	Identifies all clearly defined parameters needed to solve the problem parameters: <i>factors and conditions that define the problem</i>	Identifies only relevant explicit parameters needed to solve the problem parameters: <i>factors and conditions that define the problem</i>	Identifies only relevant explicit parameters needed to solve the problem parameters: <i>factors and conditions that define the problem</i>	Identifies relevant explicit parameters and limitations needed to solve the problem parameters: <i>factors and conditions that define the problem</i> limitations: <i>reasonable constraints in a real-world problem or context</i>	Identifies relevant explicit parameters and limitations needed to solve the problem parameters: <i>factors and conditions that define the problem</i> limitations: <i>reasonable constraints in a real-world problem or context</i>	Identifies relevant explicit parameters and infers implicit limitations needed to solve the problem parameters: <i>factors and conditions that define the problem</i> limitations: <i>reasonable constraints in a real-world problem or context</i>	Identifies explicit and implicit parameters and limitations needed to solve the problem parameters: <i>factors and conditions that define the problem</i> limitations: <i>reasonable constraints in a real-world problem or context</i>	Identifies explicit and implicit parameters and limitations needed to solve the problem parameters: <i>factors and conditions that define the problem</i> limitations: <i>reasonable constraints in a real-world problem or context</i>

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Applies <i>Applies mathematical vocabulary, tools, and symbols and develops a plan of approach to solve the problem</i>	Translates the scenario into a mathematical problem (mathematizes) <i>Translate a scenario into a problem using mathematical vocabulary</i>	Recognizes the mathematical competencies and content needed to solve the problem <i>content: refer to Math curriculum</i>	Recognizes the mathematical competencies and content needed to solve the problem <i>content: refer to Math curriculum</i>	Identifies the mathematical competencies and content needed to solve the problem <i>content: refer to Math curriculum</i>	Identifies the mathematical competencies and content needed to solve the problem <i>content: refer to Math curriculum</i>	Applies the mathematical understanding needed to partially translate a familiar scenario into a mathematical problem <i>mathematical understanding: refer to Math curriculum</i>	Applies the mathematical understanding needed to partially translate a familiar scenario into a mathematical problem <i>mathematical understanding: refer to Math curriculum</i>	Applies the mathematical understanding needed to translate a familiar scenario into a mathematical problem <i>mathematical understanding: refer to Math curriculum</i>	Applies the mathematical understanding needed to translate a familiar scenario into a mathematical problem <i>mathematical understanding: refer to Math curriculum</i>	Applies the mathematical understanding needed to translate an unfamiliar scenario into a mathematical problem <i>mathematical understanding: refer to Math curriculum</i>	Applies the mathematical understanding needed to translate an unfamiliar scenario into a mathematical problem <i>mathematical understanding: refer to Math curriculum</i>	Applies the mathematical understanding needed to translate an unfamiliar scenario into a mathematical problem <i>mathematical understanding: refer to Math curriculum</i>	Applies the mathematical understanding needed to translate a complex, unfamiliar scenario into a mathematical problem <i>mathematical understanding: refer to Math curriculum</i>	Applies the mathematical understanding needed to translate a complex, unfamiliar scenario into a mathematical problem <i>mathematical understanding: refer to Math curriculum</i>	
	Represents the mathematical problem (visualizes) <i>Visually represents a problem with mathematical tools, visual representations, or mathematical symbols</i>	Represents the mathematical problem, using concrete materials and/or pictures	Represents the mathematical problem, using concrete materials and diagrams	Represents the mathematical problem, using concrete materials and diagrams	Represents the mathematical problem, using concrete materials, diagrams, and/or some familiar equations <i>familiar: previously seen or modelled</i>	Represents the mathematical problem, using concrete materials, diagrams, and/or some familiar equations <i>familiar: previously seen or modelled</i>	Represents the mathematical problem, using concrete materials, diagrams, and/or equations <i>models: e.g., concrete materials, diagrams, equations</i>	Represents the mathematical problem, using concrete materials, diagrams, and/or equations <i>models: e.g., concrete materials, diagrams, equations</i>	Accurately represents the mathematical problem, using a variety of models <i>models: e.g., concrete materials, diagrams, equations</i>	Accurately represents the mathematical problem, using a variety of models <i>models: e.g., concrete materials, diagrams, equations</i>	Clearly represents the mathematical problem by choosing an appropriate model(s) <i>appropriate: refer to Math curriculum</i>	Clearly represents the mathematical problem by choosing an appropriate model(s) <i>models: e.g., concrete materials, diagrams, equations</i>	Clearly and accurately represents the problem in context by strategically choosing an effective model(s) <i>models: e.g., concrete materials, diagrams, equations</i>	Clearly and accurately represents the problem in context by strategically choosing an effective model(s) <i>models: e.g., concrete materials, diagrams, equations</i>	Clearly and accurately represents the problem in context by strategically choosing an effective model(s) <i>models: e.g., concrete materials, diagrams, equations</i>
	Develops a plan of approach <i>Thinks of and outlines various approaches to solve a mathematical problem</i>	Experiments with problem solving using prior knowledge	Develops a straightforward plan of approach, using prior knowledge and mathematical tools and strategies	Develops a basic plan of approach, using familiar mathematical tools and/or strategies <i>basic: could be one step</i> <i>familiar: previously seen or modelled</i>	Develops a basic plan of approach, using familiar mathematical tools and/or strategies <i>basic: could be one step</i> <i>familiar: previously seen or modelled</i>	Develops a sequence of steps that applies familiar mathematical tools and/or strategies <i>familiar: previously seen or modelled</i>	Develops a logical sequence of steps that applies familiar mathematical tools and/or strategies <i>familiar: previously seen or modelled</i>	Develops an organized and intentional sequence of steps that applies appropriate mathematical tools and/or strategies <i>appropriate: refer to Math curriculum</i>	Develops a logical and organized plan that applies appropriate mathematical tools and/or strategies <i>appropriate: refer to Math curriculum</i> <i>strategies: e.g., using a tool (calculator), picture, graph, equation</i>	Uses mathematical reasoning to develop a logical and organized plan that applies appropriate mathematical tools and/or strategies <i>appropriate: refer to Math curriculum</i> <i>strategies: e.g., using a tool (calculator), picture, graph, equation</i>	Uses mathematical reasoning to develop a logical and organized plan that applies appropriate mathematical tools and/or strategies <i>appropriate: refer to Math curriculum</i> <i>strategies: e.g., using a tool (calculator), picture, graph, equation</i>	Uses mathematical reasoning to develop a logical, organized, and effective multi-step plan that applies appropriate mathematical tools and/or strategies <i>appropriate: refer to Math curriculum</i> <i>strategies: e.g., using a tool (calculator), algorithm, picture, graph; Social Studies/Science: evidence from text</i>	Uses mathematical reasoning to develop a logical, organized, and effective multi-step plan that applies appropriate mathematical tools and/or strategies <i>appropriate: refer to Math curriculum</i> <i>strategies: e.g., using a tool (calculator), algorithm, picture, graph; Social Studies/Science: evidence from text</i>	Uses mathematical reasoning to develop a logical, organized, and effective multi-step plan that applies appropriate mathematical tools and/or strategies <i>appropriate: refer to Math curriculum</i> <i>strategies: e.g., using a tool (calculator), algorithm, picture, graph; Social Studies/Science: evidence from text</i>	

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Solves	Implements a plan to solve the mathematical problem and checks their solution	Estimates reasonably in context <i>Uses the information provided to support a best guess solution</i>	Estimates the scope of the answer <i>scope: e.g., range, size, shape, time</i>	Estimates the scope of the answer <i>scope: e.g., range, size, shape, time</i>	Estimates reasonably within known parameters, using benchmarks <i>benchmarks: e.g., 25, 50, 100, distance, colour, rhythm, pattern</i>	Estimates reasonably within identified parameters, using benchmarks and relevant information from the scenario <i>benchmarks: e.g., up to 1000, distance, colour, rhythm, pattern</i>	Estimates reasonably within identified parameters, using benchmarks and relevant information from the scenario <i>benchmarks: e.g., up to 10 000, fractions, decimals, distance, colour, rhythm, pattern</i>	Estimates reasonably within identified parameters, using benchmarks and relevant information from the scenario <i>benchmarks: e.g., up to 1 000 000, fractions, decimals, distance, colour, rhythm, pattern</i>	Estimates reasonably within the context and parameters of the scenario, using benchmarks <i>benchmarks: e.g., thousandths to billions, fractions, decimals, area, rhythm, pattern</i>	Estimates reasonably within the context and parameters of the scenario, using benchmarks <i>benchmarks: e.g., thousandths to billions, length, area; Arts: rhythm, pattern; Science: trend, frequency; Language Arts: pattern; ADST: area, materials needed</i>	Estimates reasonably within the context and parameters of the scenario, using appropriate benchmarks <i>benchmarks: e.g., perfect squares, volume; Arts: rhythm, pattern; Science: trend, frequency; Language Arts: pattern; ADST: area, volume, materials needed</i>	Estimates reasonably in context, within parameters, and considering limitations	Estimates reasonably in context, within parameters, and considering limitations; explains reasoning for estimate	Estimates reasonably in context, within parameters, and considering limitations; explains reasoning for estimate		
			Solves the mathematical problem <i>Uses various approaches to find a solution to the problem</i>	Finds a solution, using play, concrete materials, or models	Finds a solution, using play, concrete materials, or models	Finds a solution, using mathematical tools and/or strategies <i>strategies: e.g., play, concrete materials, models</i>	Finds a solution by applying familiar mathematical tools and/or strategies <i>strategies: e.g., play, concrete materials, models</i>	Finds a solution by applying familiar mathematical tools and/or strategies <i>strategies: e.g., equations, play, concrete materials, models</i>	Finds a solution by applying familiar mathematical tools and/or strategies <i>strategies: e.g., equations, play, concrete materials, models</i>	Finds a solution, using appropriate strategies <i>strategies: e.g., using a tool (calculator), picture, graph, equations, concrete materials, and/or models</i>	Finds a solution, using appropriate strategies <i>strategies: e.g., using a tool (calculator), picture, graph, equations, concrete materials, and/or models</i>	Solves the mathematical problem, using effective strategies as needed <i>strategies: e.g., using a tool (calculator), picture, graph, equations, concrete materials, and/or models</i>	Solves the mathematical problem, using effective strategies as needed <i>strategies: e.g., using a tool (calculator), picture, graph, equations, concrete materials, and/or models</i>	Solves the mathematical problem by following a logical plan and using efficient strategies as needed <i>strategies: e.g., using a tool (calculator), algorithm, picture, graph; Social Studies/Science: evidence from text</i>	Solves the mathematical problem by following a logical, multi-step plan and using efficient strategies as needed <i>strategies: e.g., using a tool (calculator), algorithm, picture, graph; Social Studies/Science: evidence from text</i>	Solves the mathematical problem by following a logical, multi-step plan and using efficient strategies as needed <i>strategies: e.g., using a tool (calculator), algorithm, picture, graph; Social Studies/Science: evidence from text</i>
				Verifies accuracy of the mathematical solution <i>Checks their solution based on similar problems, others' solutions, or their estimate</i>	Compares their solution with those of their teacher and/or peers	Compares their solution with those of their teacher and/or peers	Verifies the accuracy of their solution by comparing it with a variety of proofs/checks, including estimation	Verifies the accuracy of their solution, using familiar mathematical strategies and/or by comparing with their estimate <i>familiar: previously seen or modelled</i>	Verifies the accuracy of their solution, using reasonable estimates and other familiar mathematical strategies <i>familiar: previously seen or modelled</i>	Verifies the accuracy of their solution, using reasonable estimates and other familiar mathematical strategies <i>familiar: previously seen or modelled</i>	Verifies the accuracy of their results and/or solution, using reasonable estimates and other familiar strategies <i>familiar: previously seen or modelled</i>	Verifies the accuracy of their results and/or solution, using reasonable estimates and other familiar strategies <i>familiar: previously seen or modelled (e.g., using a tool [calculator], alternate algorithm, picture, graph)</i>	Verifies the accuracy of their results and/or solution, using reasonable estimates and other familiar strategies; identifies factors that could affect accuracy of results	Verifies the accuracy of their results and/or solution, using reasonable estimates and other familiar strategies; identifies factors that could affect accuracy of results	Verifies the accuracy of their results and/or solution, using reasonable estimates and other familiar strategies; describes how factors affect accuracy of results	Verifies the accuracy of their results and/or solution, using reasonable estimates and other familiar strategies; compares and evaluates how factors affect accuracy of results

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Analyzes <i>Reflects on the reasonableness of their solution; evaluates alternative approaches and solutions, and revises approach</i>	Reflects on the reasonableness of the solution in context <i>Looks back on the reasonableness of the solution within the context of the problem (Does this make sense?)</i>	Identifies a reasonable solution in relation to the original problem/ scenario	Identifies a reasonable solution in relation to the original problem/ scenario	Reflects on the reasonableness of a solution in relation to the original problem/scenario	Reflects on the reasonableness of a solution in relation to the original problem/scenario	Reflects on the reasonableness of their solution in relation to the original problem/ scenario	Reflects on the reasonableness of their solution in relation to the original problem/ scenario	Reflects on the reasonableness of their solution within the context of the problem	Reflects on the reasonableness of their solution within the context of the problem	Reflects on the validity of their solution within the context of the problem <i>validity: accuracy in context</i>	Reflects on the validity of their solution within the context of the problem <i>validity: accuracy in context</i>	Reflects on the validity of their solution, identifying contextual factors that may affect their answer <i>validity: accuracy in context</i> <i>solution: e.g., lab results, map, product, model</i> <i>contextual factors: e.g., Social Studies/Science: evidence from text; Arts: soliciting feedback</i>	Reflects on the validity and reliability of their processes and solutions and describes how contextual factors may affect their answer <i>validity: accuracy in context</i> <i>reliability: reproducibility of results</i>	Reflects on the validity and reliability of their processes and solutions and describes how contextual factors may affect their answer <i>validity: accuracy in context</i> <i>reliability: reproducibility of results</i>
	Evaluates alternative approaches <i>Checks on the reasonableness of others' approaches to solve the problem</i>	Identifies an alternative approach <i>approach: own approach, peer- or teacher-driven approach</i>	Identifies an alternative approach <i>approach: own approach, peer- or teacher-driven approach</i>	Explores an alternative approach <i>approach: own approach, peer- or teacher-driven approach</i>	Explores alternative approaches <i>approach: own approach, peer- or teacher-driven approach</i>	Compares and contrasts alternative approaches <i>approaches: own approach, peer- or teacher-driven approach</i>	Compares and contrasts alternative approaches <i>approaches: own approach, peer- or teacher-driven approach</i>	Describes the benefits and limitations of alternative approaches <i>approaches: own approach, peer- or teacher-driven approach</i>	Describes the benefits and limitations of alternative approaches <i>approaches: own approach, peer- or teacher-driven approach</i>	Evaluates the benefits and limitations of alternative approaches <i>approaches: own approach, peer- or teacher-driven approach</i>	Evaluates the benefits and limitations of alternative approaches <i>approaches: own approach, peer- or teacher-driven approach, comparison with research- based approaches</i>	Evaluates the efficiency and effectiveness of alternative approaches <i>approaches: own approach, peer- or teacher-driven approach, comparison with research- based approaches</i>	Evaluates the efficiency and effectiveness of alternative approaches and possible improvements <i>approaches: own approach, peer- or teacher-driven approach, comparison with research- based approaches</i>	Evaluates the efficiency and effectiveness of alternative approaches and possible improvements <i>approaches: own approach, peer- or teacher-driven approach, comparison with research- based approaches</i>
	Revises approach as needed <i>Revises their approach based on checking with others' solution and/or approach</i>	Experiments with a recommended alternative approach to solve the problem	Experiments with a recommended alternative approach to solve the problem	Selects an alternative approach to solve the problem	Selects an alternative approach to solve the problem	Identifies and experiments with an alternative approach to solve the problem	Identifies and experiments with an alternative approach to solve the problem	Refines approach, using the benefits and limitations of alternative approaches to solving the problem <i>refines: improves through small changes</i>	Refines approach, using the benefits and limitations of alternative approaches to solving the problem <i>refines: improves through small changes</i>	Revises approach, using the benefits and limitations of alternative approaches to solving the problem <i>revises: reflects and adjusts</i>	Revises approach based on their evaluation of alternative approaches to solving the problem <i>revises: reflects and adjusts</i>	Revises approach, using the benefits and limitations of alternative approaches to compare alternative solution(s) to the problem <i>revises: reflects and adjusts</i>	Redesigns approach to improve efficiency of process or accuracy of solution to the problem <i>redesigns: iteratively reflects and adjusts</i>	Redesigns approach to improve efficiency of process or accuracy of solution to the problem <i>redesigns: iteratively reflects and adjusts</i>

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Communicates <i>Represents, explains, and defends their approach and solution within the problem's scenario</i>	Represents processes and solution <i>Effectively communicates the thinking and/or understanding in their approach and/or solution using visual representations or mathematical symbols</i>	Represents the problem-solving process, using numbers, pictures, and/or manipulatives	Represents the problem-solving process, using words, numbers, pictures, symbols, and/or manipulatives	Represents the problem-solving process, using familiar tools familiar tools: e.g., manipulatives, symbols, graphic organizers, charts	Represents processes and solution by selecting and using reasonable tools reasonable tools: e.g., table, manipulative, graphic organizer, array, model	Represents processes and solution by selecting and using reasonable tools reasonable tools: e.g., model, chart, map, table, graph, array	Represents processes and solution by selecting and using reasonable tools reasonable tools: e.g., model, chart, map, table, graph, array	Represents the complete process and solution by selecting and using appropriate tools appropriate tools: e.g., model, chart, map, table, graph, array	Represents the complete process and solution by selecting and using appropriate tools appropriate tools: e.g., model, chart, map, table, graph, array, equation	Effectively represents the complete process and solution, using appropriate presentations appropriate presentations: e.g., bulleted explanation, equation, graph, model, map, table, array	Effectively represents the complete process and solution, using appropriate presentations appropriate presentations: e.g., bulleted explanation, equation, graph, model, map, table, diagram	Represents complex processes and solutions, using a variety of presentations in a manner that is suitable to the context presentations: e.g., bulleted explanation, equation, graph, model, map, table, diagram	Represents complex processes and solutions; chooses a presentation that suits the purpose, context, and audience presentation: e.g., proof, model, equation, graph, model, map, table, diagram	Represents complex processes and solutions; chooses a presentation that suits the purpose, context, and audience presentation: e.g., proof, model, equation, graph, model, map, table, diagram
	Explains the approach taken <i>Clearly explains their problem-solving approach and solution with mathematical vocabulary</i>	Identifies one step of their problem-solving approach	Outlines their problem-solving approach	Outlines their problem-solving approach, using familiar mathematical language familiar: previously seen or modelled mathematical language: refer to Math curriculum	Describes their problem-solving approach, using familiar mathematical language familiar: previously seen or modelled mathematical language: refer to Math curriculum	Describes their problem-solving approach, using familiar mathematical language familiar: previously seen or modelled mathematical language: refer to Math curriculum	Describes their problem-solving approach, using familiar mathematical language familiar: previously seen or modelled mathematical language: refer to Math curriculum	Accurately explains their problem-solving approach approach: e.g., process: making a model; tool: manipulatives; strategy: using an equation	Accurately explains their problem-solving approach approach: e.g., process: making a model; tool: calculator; strategy: using an equation	Accurately explains their problem-solving approach, identifying its limitations and assumptions approach: e.g., process: making a diagram; tool: calculator; strategy: using an equation	Accurately explains their problem-solving approach, identifying its limitations and assumptions approach: e.g., process: making a diagram; tool: calculator; strategy: using an equation	Explains their problem-solving approach, describing any limitations and assumptions approach: e.g., process: making a flowchart; tool: calculator; strategy: using a familiar algorithm or evidence from text	Explains their problem-solving approach accurately and in detail, evaluating the effect of any assumptions or limitations approach: e.g., process: making a flowchart; tool: calculator; strategy: using an algorithm or evidence from text evaluating: assessing the implications	Explains their problem-solving approach accurately and in detail, evaluating the effect of any assumptions or limitations approach: e.g., process: making a flowchart; tool: calculator; strategy: using an algorithm or evidence from text evaluating: assessing the implications
	Defends decisions and assumptions <i>Clearly justifies and defends the decisions and assumptions made in their approach and/or solution</i>	Identifies one problem-solving decision	Outlines one problem-solving decision	Describes one problem-solving decision and a supporting reason	Describes their problem-solving decisions and supporting reasons	Explains their problem-solving decisions and supporting reasons	Explains their problem-solving decisions and supporting reasons	Presents a rationale for their problem-solving decisions and assumptions	Presents a rationale for their problem-solving decisions and assumptions	Presents a logical argument and justifies their decisions and assumptions	Presents a logical argument and justifies their decisions and assumptions	Presents a valid, logical argument to justify their decisions about the selected approach and assumptions, and describes the effects of these choices	Presents a valid, logical argument to justify their decisions about the selected approach, evaluating assumptions and the effects of their choices evaluating: assessing the implications	Presents a valid, logical argument to justify their decisions about the selected approach, evaluating assumptions and the effects of their choices evaluating: assessing the implications