دائـرة الـتـعـلـيـم والـمـعـرفـة
DEPARTMENT OF EDUCATION
AND KNOWLEDGE

The K-12 AI Literacy Framework: From Awareness to Systems Design

Empowering Abu Dhabi's AI Enabled Learners: Defining a Global Entitlement from Awareness to Systems Design

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Vision & Rationale

Why AI Literacy in Abu Dhabi?

In Abu Dhabi, AI literacy is no longer viewed as an elective technical skill but as a fundamental entitlement for every student. As AI becomes a transversal force across all sectors of life, general knowledge is required for all citizens to lead safe, self-determined lives. Our vision is to transition from merely providing students with "access" to AI tools to a model of "AI Entitlement," in which every graduate possesses the agency to audit, design, and regulate the technology of the future.

Alignment to UAE Vision 2031: This curriculum is a primary engine for the UAE Vision 2031 and the UAE Centennial Plan 2071. By cultivating a workforce that relates to technology in a "healthy, daily way," we ensure the UAE remains a global hub for the digital economy while preserving our unique cultural identity.

Human-Centered AI Positioning Abu Dhabi's approach is grounded in the emirate's vision of ensuring *"an education system that cultivates confident, values-driven learners who harness AI to think critically, act ethically, and contribute to the prosperity and well-being of Abu Dhabi and the world."* This framework empowers Abu Dhabi students as co-creators rather than passive consumers. We prioritize a Human-Centered Mindset, where AI is treated as a "smart assistant" governed by human rules, ethical judgment, and citizenship responsibilities.

Global forefront. While most global systems focus on awareness-level literacy or middle-school electives, Abu Dhabi is positioning itself as a Global Leader in AI Education Architecture. By mandating technical creation moving from AI-powered solution creation by Grade 8 to System Design by Grade 12, ADEK surpasses the "user-only" milestones seen in other established curricula and frameworks.

The K–12 AI Education Framework is designed to ensure that students graduating from schools in Abu Dhabi will be able to:

- **Critically evaluate** AI outputs for accuracy, bias, and reliability.
- **Design and apply AI-powered solutions** to solve defined and real-world problems and perform targeted tasks.
- **Combine AI tools, data, and workflows** to develop and refine scalable solutions.
- **Assess AI systems** for ethical use and data privacy using a systems-thinking approach.

This framework positions Abu Dhabi not merely as a consumer of AI technologies but as a system that prepares future architects, regulators, and innovators of AI systems. Abu Dhabi graduates will leave our schools as the world's first generation of 'AI Architects'. Leaders who do not merely adapt to an AI-driven future but possess the architectural agency to design, build, and govern it.

The framework is technology-agnostic, ensuring that learning outcomes remain relevant despite rapid advancements in AI tools and systems.

AI literacy in Abu Dhabi begins at age four with structured cognitive foundations and progresses intentionally toward system architecture, governance, and deployment by Grade 12.

Abu Dhabi AI Learner Profile: Developmental Progression Model

This curriculum anchors student development in four distinct "AI Learner Profiles" that define the journey from awareness to systems design.

AI literacy begins in kindergarten through cognitive foundations and structured digital awareness. **Direct engagement with AI tools is developmentally introduced from upper primary**, with increasing technical complexity through middle and secondary school. This progression ensures coherence from early awareness to advanced system-level competence.

AI Aware Explorer | AI Literate Thinker | AI Solution Builder | AI Systems & Solutions Designer

Phase/Cycle	AI Learner Profile	Core Competency Milestone
Phase 1/KG: **KG1–KG2**	**AI Aware Explorer**	**Explores inputs and responses through play** Students distinguish between human senses and basic machine inputs and understand cause-and-effect relationships. Learning is unplugged with no direct AI tool use.
Phase 2/Cycle 1: **Grades 1–5**	**AI Literate Thinker**	**Applies rules, logic, and data to generate and evaluate outputs.** Students' progress from rule-based thinking to multi-step logic, develop an understanding of how data influences outcomes, and begin interacting with AI tools to refine outputs.
Phase 3/Cycle 2: **Grades 6–8**	**AI Solution Builder**	**Designs and improves AI-powered solutions using data, models, and workflows.** Students build, evaluate, and refine solutions using structured processes and foundational ML concepts.
Phase 4/Cycle 3: **Grades 9–12**	**AI Systems & Solutions Designer**	**Designs and governs integrated AI systems.** Students develop real-world solutions using systems thinking and ensure effectiveness, responsibility, and alignment with societal and governance expectations.

THE AI LEARNER PROFILE
FROM PLAY TO PROFESSIONAL DESIGN

Defining a structured progression from early awareness to advanced expertise.



01

AI AWARE EXPLORER
(AGES 4–5)

Focuses on unplugged play to understand machine inputs versus human senses.

AI LITERATE THINKER
(AGES 6–10)

Shifts to multi-step logic and direct interaction with AI tools to refine outputs.



02



03

AI SOLUTION BUILDER
(AGES 11–13)

Students apply Machine Learning concepts to build, evaluate, and refine structured AI solutions.

AI SYSTEMS & SOLUTIONS DESIGNER
(AGES 14–18)

Focuses on professional systems thinking, governance, and aligning AI with societal expectations.



04

FOUR VERTICALY ALIGNED STRANDS

- AI CONCEPTUAL UNDERSTANDING
- CRITICAL EVALUATION & INFORMED INTERACTION
- AI SOLUTION DESIGN & DEVELOPMENT
- RESPONSIBLE GOVERNANCE, DATA PRIVACY, & SOCIETAL IMPACT

OUTCOMES

- Critically evaluate AI outputs for accuracy, bias, and reliability.
- Design and apply AI powered solutions to solve defined & real-world problems
- Combine AI tools, data, and workflows to develop and refine scalable solutions
- Assess AI systems for ethical use and data privacy

The Strands-Based Structure- Spiral Learning Design

The Abu Dhabi AI curriculum is built upon **four interconnected strands** that ensure students develop a balanced proficiency in the technical "know-how" and the ethical "know-why" of Artificial Intelligence.

The curriculum employs a **Spiral Learning Design,** which ensures foundational concepts are revisited with increasing complexity. In the early years, strands are experienced through sensory play and observation. By the middle phase, these same strands require students to evaluate and refine models. In phase 4, students integrate all four strands to design autonomous, ethically-audited systems that solve real-world community challenges.

The framework is organized across the following four vertically aligned strands:

AI Conceptual Understanding: *Knowing How Intelligent Systems Learn and Operate*
Critical Evaluation and Informed Interaction: *Exercising Judgement in the Use of AI Systems*
AI Solution Design and Development: *Designing and Building Intelligent Solutions*
Responsible Governance, Data Privacy, and Societal Impact: *Assessing AI Systems for Ethical Use*

These strands increase in complexity across phases, ensuring that conceptual understanding precedes creation, and that ethical reasoning matures alongside technical capability.

Strand	Educational Purpose
AI Conceptual Understanding	Students develop a principled understanding of how artificial intelligence systems function, learn from data, and generate outputs. This competency integrates: • Foundations of data representation and quality • Differences between rule-based, machine learning, and generative systems • Model training, validation, and limitations • Trade-offs between accuracy, interpretability, and scale
Critical Evaluation and Informed Interaction	Students develop disciplined evaluative thinking when engaging with AI technologies. This includes: • Structuring precise inputs and prompts • Assessing outputs for accuracy, bias, reliability, and appropriateness • Applying quantitative evaluation metrics • Comparing alternative model responses • Bias detection and mitigation • Recognizing uncertainty and hallucination

AI Creation, Engineering, and System Design	Students progressively develop the ability to move from structured interaction to independent engineering. This competency integrates: • Logical structuring and programming • Model training and iteration • AI-powered solutions and multi-component systems • End-to-end AI pipeline design • Deployment, monitoring, and optimization
Responsible Governance, Data Privacy, and Societal Impact	Students develop ethical judgement and system-level awareness alongside technical competence. This competency integrates: • Data privacy and personal information protection • Risk analysis and impact assessment • Regulatory and policy awareness • Socio-economic and labor market implications • Systems thinking and consequence analysis

The framework is organized into two primary levels of detail: the Macro-Level (End-of-Phase/Cycle Expectations) and the Micro-Level (Year/Grade Learning Outcomes).

1. **The Macro-Level: End-of-Phase/Cycle Expectations** provides a high-level summary of the student's AI Identity (e.g., AI Aware Explorer).

   The structure is anchored in a competency-based model that categorizes learning into four distinct areas to ensure a holistic development of students as "AI co-creators" rather than just users.

   - **Knowledge Outcomes:** These address the cognitive demands and domain-specific information deemed necessary to engage in AI competencies. They utilize verbs such as "know," "understand," "reflect," and "compare". Examples include understanding the technical foundations of AI, such as how algorithms use statistical inferences to process data, recognizing the difference between human thinking and machine learning, and identifying the role of data quality in AI outputs.

   - **Skills Outcomes:** These refer to the psychomotor aspects and functional abilities required to interact with, create, and manage AI systems. Skills outcomes typically include action verbs such as "use," "create," "build," "revise," "write," and "analyze". Practical applications involve constructing structured prompts (prompt engineering), combining tools and workflows, training machine learning models, and designing structured solutions that include data ingestion and monitoring.

   - **Dispositions / Attitudes:** Often categorized as "Values" in international frameworks, these are the guiding principles and mindsets that prepare students to engage with AI responsibly and ethically. They represent future-ready attitudes such as curiosity, adaptability, persistence, and empathy toward those impacted by AI. These dispositions encourage students to be critical consumers who question machine outputs and commit to using technology for the "public good".

- **Core Competencies:** These are the interdisciplinary, transversal "operational organs" of AI literacy that remain consistent throughout each learning phase. Rather than being disparate topics, they are woven together to support a systematic schema of mastery. In the early phases, these focus on Early Computational Thinking, Pattern Recognition, and Structured Communication. As students mature, they evolve into higher-order competencies like Critical Evaluation of AI Outputs, AI Governance and Impact Assessment, and Systems Thinking.

2. **The Micro-Level: Grade/Year Learning Outcomes**

Below the phase/cycle expectations, the framework breaks down expectations into granular, measurable actions for each specific grade level (e.g., KG1/FS2). This level uses a three-tier progression model for every strand to assess student mastery. While the Macro-level defines the "Identity" of a phase, this Micro-level provides the granularity required for personalized student progression.

1. **Emerging** Definition: This tier represents the initial engagement with a strand.
    - *The Action:* Descriptors at this level typically involve recognition, following guided templates, or identifying concepts with adult support.
    - *Purpose:* It ensures that every student has an accessible starting point, preventing them from falling behind as complexity increases.
2. **Proficient:** The "National Entitlement" Standard
    - *Definition:* This is the baseline expectation for every student in Abu Dhabi. It represents the "Apply" level of mastery.
    - *The Action:* Descriptors here shift to independent execution.
    - *Purpose:* This tier defines the "guaranteed proficiency" that prepares students for the UAE's digital economy.
3. **Advanced:** The "Strategic Leadership" Tier
    - Definition: This tier identifies students capable of synthesis and defense, aligning with the SOLO Taxonomy's "extended abstract" capacity.
    - The Action: Descriptors require students to justify architectural decisions, optimize systems for trade-offs, and defend their work.
    - Purpose: This tier identifies future "AI Architects" who can lead the design of national assets.

Overview of Scope and Sequence

Grade	Conceptual Focus	Technical Focus	Creation Focus	Ethics Focus
KG1	Understanding physical cause and effect and the role of sensors.	Using physical sequencing (unplugged).	Following 1-step verbal instructions (unplugged).	Recognizing personal information and trusted adults
KG2	Understanding that digital tools use information.	Using multi-attribute grouping (unplugged).	Following 2–3 step verbal instructions (unplugged).	Recognizing privacy basics and differences between human and machine communication
Grade 1	Understanding that machines follow rules using inputs and outputs.	Using basic logic sequences.	Completing guided digital tasks to solve simple problems.	Practicing safe information sharing and following class rules
Grade 2	Understanding rules and choices in digital systems.	Using simple decision logic.	Creating simple rule-based solutions to automate tasks.	Recognizing fairness and unfairness in simple digital examples
Grade 3	Understanding how rules can be combined to make more complex decisions.	Applying multi-step decision logic (sequencing and simple conditions).	Creating multi-step rule-based solutions to solve problems.	Recognizing how rules affect outcomes and identifying potential unfairness
Grade 4	Understanding how data is represented and used in digital systems.	Using pattern recognition and simple data labeling.	Creating solutions using block-based code to simulate decision logic.	Evaluating output fairness based on input data
Grade 5	Understanding how data is used to generate outputs in learning systems.	Using prompting and output checking to interact with AI tools.	Creating and refining outputs using structured prompts.	Evaluating information reliability and recognizing misinformation
Grade 6	Understanding the difference between rule-based and learning systems.	Applying introductory ML concepts, including training and testing datasets.	Building structured AI solutions and simple model training tasks.	Recognizing bias in outputs and identifying privacy and safety risks
Grade 7	Understanding how AI systems are structured as workflows.	Developing workflow design using input, process, and output structures.	Developing simple AI solutions using structured workflows.	Analyzing risks in AI system responses
Grade 8	Understanding how AI models are evaluated and improved.	Applying iterative refinement techniques.	Designing and refining AI solutions based on performance.	Applying strategies to mitigate bias and risk
Grade 9	Understanding how AI system components interact.	Applying input-output modelling.	Designing structured AI workflows.	Analyzing ethical risks in AI applications
Grade 10	Understanding how AI systems operate as integrated solutions.	Applying systems thinking to combine tools and data.	Designing multi-step AI solutions.	Evaluating bias and fairness in AI systems
Grade 11	Understanding how AI solutions are optimized for performance.	Applying performance evaluation techniques.	Improving AI solutions for efficiency and usability.	Analyzing the impact of AI solutions
Grade 12	Understanding how AI systems are designed for strategic use.	Applying evaluation and decision-making frameworks.	Designing and refining multi-component AI systems.	Evaluating governance and societal impact

END OF PHASE/ CYCLE EXPECTATIONS



Phase 1: KG1 & KG2							
AI Learner Profile: AI AWARE EXPLORER	Students recognize how simple systems respond to actions in their everyday environment through physical interaction, unplugged observation and sensory play. Actual digital engagement with AI tools and technology is **not expected** in the early years.						
Strands \ Outcomes	**Learning Progression Levels**			**Knowledge Outcomes**	**Skills Outcomes**	**Dispositions / Attitudes**	**Core Competencies**
	Emerging	**Proficient**	**Advanced**				
AI Conceptual Understanding	Identifies physical devices and observes that they respond to actions.	Distinguishes between human actions and machine responses using simple examples.	Explains how machines follow simple rules or react to inputs through play.	Understands that machines respond to inputs using simple rules.	Identifies sensors (e.g., cameras, microphones) and describes basic input–response relationships.	Shows curiosity about how systems respond to actions.	• Early computational thinking • Pattern recognition • Structured communication • Responsible behavior awareness • Emerging ethical awareness
Data Awareness	Recognizes that information is needed to complete a task.	Sorts objects based on one attribute.	Sorts objects using multiple attributes and explains choices.	Understands that systems use information to function.	Groups and organizes physical objects based on attributes.	Values accuracy and care when organizing information.	
Critical Evaluation & Informed Interaction	Gives simple verbal instructions with support.	Gives clear 1–2 step instructions and adjusts when needed.	Predicts outcomes when instructions change and refines them.	Understands that clear instructions affect outcomes.	Provides and adjusts simple step-by-step instructions.	Demonstrates persistence and problem-solving.	
Ethics & Privacy	Identifies personal information when prompted.	Recognizes what information should be kept private.	Explains why privacy matters in simple scenarios.	Understands basic privacy concepts.	Identifies safe vs unsafe sharing in guided situations.	Values safety and fairness in interactions.	

Phase 2/Cycle 1: Grades 1-5							
Student Profile: AI LITERATE THINKER	Students understand foundational AI concepts, apply rule-based and multi-step logic, and interact with AI tools to generate and refine outputs. They begin to evaluate outputs critically and develop early awareness of how data influences results.						
Outcomes / Strands	**Learning Progression Levels**			**Knowledge Outcomes**	**Skills Outcomes**	**Dispositions / Attitudes**	**Core Competencies**
	Emerging	**Proficient**	**Advanced**				
AI Conceptual Understanding	Identifies AI in everyday tools and understands that systems follow rules.	Explains how rules can be combined and how systems use data to produce outputs.	Explains how data quality affects outputs and recognizes early learning systems.	Understands how AI systems use rules and data to generate outputs.	Uses examples to explain inputs, rules, and outputs.	Develops awareness of when AI is useful and its limitations.	• AI conceptual literacy • Data awareness and organization • Logical design and structured thinking •Introduction to AI Interaction and Prompting • Responsible AI use
Data Literacy	Sorts and labels simple data.	Explains how data quality affects results.	Improves datasets to reduce errors or bias.	Understands that data can be incomplete or unbalanced.	Organizes and refines simple datasets.	Shows care and accuracy in handling data.	
AI Solution Design & Development	Creates simple rule-based solutions.	Builds multi-step logic solutions and uses block-based tools.	Uses AI tools with prompts to generate and refine outputs.	Understands progression from rules → logic → AI-assisted outputs.	Builds and refines solutions using logic and prompting.	Demonstrates creativity and persistence.	
Ethics & Responsible Use	Recognizes when outputs are incorrect or unfair.	Evaluates outputs for accuracy and fairness.	Identifies misinformation and explains reliability concerns.	Understands fairness, bias, and reliability in outputs.	Evaluates outputs and explains reasoning.	Questions outputs and seeks verification.	

Phase 3/Cycle 2: Grades 6-8							
Student Profile: AI SOLUTION BUILDER	Students design, build, and evaluate AI-powered solutions using structured workflows and foundational machine learning concepts. They refine outputs through iteration and apply basic risk awareness.						
Outcomes / Strands	**Learning Progression Levels**			**Knowledge Outcomes**	**Skills Outcomes**	**Dispositions / Attitudes**	**Core Competencies**
	Emerging	**Proficient**	**Advanced**				
AI Conceptual Understanding	Describes the difference between rule-based and learning systems.	Explains how models use training data to generate outputs.	Explains how data quality and design affect performance.	Understands ML foundations, including training, data, and outputs.	Applies understanding of datasets, inputs, and outputs.	Demonstrates analytical thinking and precision.	• AI conceptual understanding • Workflow design and prompting • AI solution creation and iteration • Output evaluation • Risk awareness
AI Solution Design & Development	Uses AI tools with structured prompts.	Design solutions using workflows (input → process → output).	Refines solutions through iteration and optimization.	Understands how workflows structure AI systems.	Designs and applies structured AI solutions.	Demonstrates creativity and problem-solving.	
Critical Evaluation & Informed Interaction	Identifies incorrect or unclear outputs.	Evaluates outputs for accuracy and relevance.	Explains causes of errors and improves solutions.	Understands evaluation as part of system design.	Applies criteria to refine solutions.	Demonstrates accountability and critical thinking.	
Ethics & Governance	Identifies basic risks (incorrect outputs, misuse).	Explains bias, privacy, and responsible use.	Proposes mitigation strategies.	Understands risks in AI systems.	Applies ethical considerations in solutions.	Demonstrates responsibility and awareness.	

Phase 4/Cycle 3: Grades 9-12							
Student Profile: AI Systems & Solutions Designer	Students design, evaluate, and refine AI-powered solutions to address real-world problems. They integrate data, tools, and workflows using systems thinking, and ensure solutions are effective, responsible, and aligned with societal and governance expectations.						
Outcomes / Strands	**Learning Progression Levels**			**Knowledge Outcomes**	**Skills Outcomes**	**Dispositions / Attitudes**	**Core Competencies**
	Emerging	**Proficient**	**Advanced**				
AI Systems Understanding	Describes how components (data, models, tools) interact.	Designs structured workflows for real-world problems.	Designs integrated multi-component systems.	Understands how systems combine data, tools, and workflows.	Designs structured AI systems.	Demonstrates adaptability and systems thinking.	• AI systems understanding • Systems integration • Solution design • Evaluation and validation • Governance and impact analysis
AI Solution Design & Development	Uses AI tools for defined tasks.	Selects tools and structures workflows appropriately.	Optimizes solutions based on performance and context.	Understands trade-offs in solution design.	Selects and applies tools based on need and performance.	Demonstrates critical judgment.	
Critical Evaluation & Informed Interaction	Identifies limitations in outputs.	Evaluates using accuracy, bias, and usefulness criteria.	Justifies improvements using evidence.	Understands variability in outputs.	Applies evaluation frameworks.	Demonstrates persistence and accountability.	
Governance, Ethics & Societal Impact	Identifies ethical risks.	Conducts structured risk analysis.	Designs responsible and socially aligned solutions.	Understands governance and societal impact.	Applies governance principles in design.	Demonstrates ethical leadership.	

END OF Year/ Grade EXPECTATIONS



Phase 1/KG

AI AWARE EXPLORER

Grade/Year: KG1/FS2

KG 1/FS2 CORE COMPETENCIES:

Early Computational Thinking **Pattern Recognition (Foundational)** **Structured Communication (Basic)**
Responsible Behavior Awareness **Emerging Ethical Awareness**

Learning Outcomes			
Strands \ Progression level	**Emerging**	**Proficient**	**Advanced**
AI Conceptual Understanding	Notices that machines or objects respond to human actions through unplugged observation.	Identifies simple sensors (e.g., cameras, microphones) and distinguishes them from human senses.	Describes simple cause-and-effect relationships independently during physical play.
Data Awareness	Recognizes that information is needed to complete a task in guided physical examples.	Sorts physical objects and explains grouping by one attribute (e.g., color, shape, size).	Sorts using multiple attributes and explains how grouping supports decision-making.
Critical Evaluation & Informed Interaction	Follows one-step instructions from a peer or teacher during role-play.	Follows and gives simple 1–2 step instructions clearly.	Identifies unclear instructions and suggests simple improvements independently.
Ethics & Privacy	Recognizes personal information (e.g., name, age) when prompted.	Explains that some information is private and seeks adult help when unsure.	Demonstrates safe behavior in social play and explains why it is important.

Phase 1/ KG

AI AWARE EXPLORER

Grade/Year: KG2/YEAR 1

KG 2/Year 1 CORE COMPETENCIES:

Early Computational Thinking **Pattern Recognition and Classification** **Structured Communication (Developing)**
Responsible Digital Behavior **Emerging Ethical Awareness and Fairness**

Learning Outcomes			
Strands \ Progression level	**Emerging**	**Proficient**	**Advanced**
AI Conceptual Understanding	Recognizes that some digital tools respond to inputs (e.g., voice, touch).	Explains simple differences between human decisions and machine responses.	Explores how sensors and patterns influence responses through structured play.
Data Awareness	Sorts objects using one or more attributes.	Sorts and groups objects using more than one attribute and explains reasoning.	Demonstrates that incomplete or incorrect information leads to incorrect outcomes.
Critical Evaluation & Informed Interaction	Recognizes that clearer instructions lead to better responses.	Gives clear 2–3 step instructions and adjusts wording when needed.	Demonstrates persistence in refining instructions through iterative play.
Ethics & Privacy	Understands basic ideas of privacy and fairness in simple contexts.	Identifies personal information and explains why it should be kept private.	Consistently demonstrates safe, fair, and respectful behavior in interactions.

Phase 2: Grades 1-5

AI Literate Thinker

Grade/Year: Grade 1/YEAR 2

GRADE 1/YEAR 2 CORE COMPETENCIES:

AI Conceptual Literacy Data Categorization Logical Sequencing and Rule-Based Thinking
Structured Communication Responsible and Safe Use

Learning Outcomes			
Strands / Progression level	**Emerging**	**Proficient**	**Advanced**
AI Conceptual Understanding	Recognizes that machines follow simple rules to respond.	Describes inputs and outputs using everyday examples.	Explains how changing an input changes the output.
Data Awareness	Sorts information into simple groups with guidance.	Sorts information independently using one attribute.	Explains how different information leads to different results.
Critical Evaluation & Informed Interaction	Follows simple step-by-step instructions with support.	Creates simple step sequences to complete a task.	Adjusts steps when outcomes are not correct.
Responsible AI Use	Identifies personal information and safe sharing.	Follows rules for safe and respectful use.	Explains fairness in simple situations.

Phase 2: Grades 1-5

AI LITERATE THINKER

Grade/Year: Grade 2/YEAR 3

GRADE 2/YEAR 3 CORE COMPETENCIES:

AI Conceptual Literacy | Data Categorization and Organization | Decision Logic and Rule Application | Structured Communication | Responsible and Fair Use

Learning Outcomes			
Strands \ Progression level	**Emerging**	**Proficient**	**Advanced**
AI Conceptual Understanding	Recognizes that systems follow rules and make simple choices.	Explains simple decision logic (if/then).	Explains how rules affect outcomes in different situations.
Data Awareness	Sorts information using one attribute.	Sorts using more than one attribute.	Explains how incorrect or missing information affects outcomes.
Critical Evaluation & Informed Interaction	Uses simple step-by-step instructions.	Creates multi-step instructions to solve a task.	Improves instructions to make outcomes more accurate.
Responsible AI Use	Identifies safe vs unsafe sharing.	Explains fairness in simple examples.	Recognizes when outcomes may be unfair.

Phase 2: Grades 1-5

AI LITERATE THINKER

Grade/Year: Grade 3/YEAR 4

GRADE 3/YEAR 4 CORE COMPETENCIES:

AI Conceptual Literacy Data Awareness, and Input Quality Multi-Step Logic and Rule Design
Structured Communication and Instruction Refinement Fairness in Rule-Based Systems

Learning Outcomes			
Strands / Progression level	**Emerging**	**Proficient**	**Advanced**
AI Conceptual Understanding	Recognizes that multiple rules can be combined.	Explains how combining rules affects outcomes.	Predicts outcomes when rules are changed.
Data Awareness	Recognizes that different information affects decisions.	Explains how missing or incorrect information changes outcomes.	Identifies simple errors in information and suggests improvements.
Critical Evaluation & Informed Interaction	Creates multi-step instructions with support.	Creates structured instructions combining steps and conditions.	Refines instructions independently to improve outcomes.
Responsible AI Use	Recognizes when results may not be fair.	Explains how rules can create unfair outcomes.	Suggests simple ways to make outcomes fairer.

Phase 2: Grades 1-5

AI LITERATE THINKER

Grade/Year: Grade 4/YEAR 5

GRADE 4/YEAR 5 CORE COMPETENCIES:

Data Representation and Understanding Data Labelling and Organization Logic and Data-Driven Problem Solving
Structured Solution Development Fairness in Data Use

Learning Outcomes			
Strands / Progression level	**Emerging**	**Proficient**	**Advanced**
AI Conceptual Understanding	Recognizes that systems use data to make decisions.	Explains how data is represented and used.	Explains how patterns in data influence outcomes.
Data Awareness	Labels and organizes simple data.	Identifies errors or imbalance in data.	Improves data to make it more accurate and balanced.
Critical Evaluation & Informed Interaction	Uses block-based tools to simulate decisions.	Creates simple solutions using data and logic.	Explains how data influences the outcome of a solution.
Responsible AI Use	Recognizes that data can affect fairness.	Explains how biased data leads to unfair outcomes.	Evaluates fairness based on input data.

Phase 2: Grades 1-5

AI LITERATE THINKER

Grade/Year: Grade 5/YEAR 6

GRADE 5/YEAR 6 CORE COMPETENCIES:

AI Conceptual Understanding Data Quality and Reliability Awareness Prompting, and AI Interaction
AI Output Generation and Refinement Responsible AI Use, and Output Evaluation

Learning Outcomes			
Strands \ Progression level	**Emerging**	**Proficient**	**Advanced**
AI Conceptual Understanding	Recognizes that AI systems generate outputs using data.	Explains how AI uses data to generate responses.	Explains how data quality affects AI outputs.
Data Literacy	Recognizes that data affects outputs.	Identifies when data is incomplete or biased.	Suggests improvements to make data more reliable.
AI Solution Design & Development	Uses AI tools to generate simple outputs with guidance.	Uses structured prompts to generate useful outputs.	Refines prompts to improve output quality and explains why.
Ethics & Responsible Use	Recognizes when outputs may be incorrect.	Evaluates outputs for accuracy and fairness.	Explains misinformation risks and proposes verification strategies.

Phase 3: Grades 6-8

AI SOLUTION BUILDER

Grade/Year: Grade 6/YEAR 7

GRADE 6/YEAR 7 CORE COMPETENCIES:

AI Conceptual Understanding | Machine Learning Foundations | Structured AI Solution Development | Evaluation of AI Outputs | Responsible AI Use and Risk Awareness

Learning Outcomes			
Strands \ Progression level	**Emerging**	**Proficient**	**Advanced**
AI Conceptual Understanding	Recognizes the difference between rule-based and learning systems.	Explains how AI systems learn from data to generate outputs.	Explains how training data affects output quality and performance.
AI Solution Design & Development	Uses AI tools with structured prompts to complete tasks.	Applies simple structured processes (input → output) to generate results.	Builds structured AI-assisted solutions using guided inputs and data.
Critical Evaluation & Informed Interaction	Identifies when outputs are incorrect or unclear.	Evaluates outputs for accuracy and relevance.	Explains how changes to inputs or data improve outputs.
Ethics & Governance	Recognizes basic risks (e.g., incorrect outputs, unsafe use).	Explains bias, privacy, and the need for responsible use.	Identifies biased outputs and suggests simple ways to improve fairness and safety.

Phase 3: Grades 6-8

AI SOLUTION BUILDER

Grade/Year: Grade 7/YEAR 8

GRADE 7/YEAR 8 CORE COMPETENCIES:

AI Systems Understanding | Workflow Design and Multi-Step Problem Solving | AI Solution Development | Evaluation and Iterative Improvement | Ethical Risk Analysis

Learning Outcomes			
Strands \ Progression level	**Emerging**	**Proficient**	**Advanced**
AI Conceptual Understanding	Describes how AI systems follow a sequence of steps (input → process → output).	Explains how workflows structure AI systems.	Explains how different workflow designs affect outcomes.
AI Solution Design & Development	Builds simple AI solutions using guided steps.	Designs multi-step AI workflows to complete tasks.	Refines workflows by improving structure, sequencing, and tool selection.
Critical Evaluation & Informed Interaction	Identifies issues in outputs or workflow steps.	Evaluates outputs using criteria such as accuracy and usefulness.	Improves workflows through iteration and explains the impact of changes.
Ethics & Governance	Identifies risks in AI-generated outputs.	Explains bias, misuse, and limitations in workflows.	Proposes ways to reduce risks and improve the responsible use of AI systems.

Phase 3: Grades 6-8

AI SOLUTION BUILDER

Grade/Year: Grade 8/YEAR 9

GRADE 8/YEAR 9 CORE COMPETENCIES:

AI Systems Understanding **AI Workflow Design and Integration** **AI Solution Development and Refinement**
Performance Evaluation and Optimization **Responsible AI Governance**

Learning Outcomes			
Strands \ Progression level	**Emerging**	**Proficient**	**Advanced**
AI Conceptual Understanding	Describes how AI systems process inputs and generate outputs.	Explains how different factors (data, inputs, design) affect performance.	Compares approaches and explains why some solutions perform better.
AI Solution Design & Development	Develops AI-powered solutions for specific tasks.	Designs structured workflows combining multiple steps or tools.	Designs and refines solutions considering how components interact.
Critical Evaluation & Informed Interaction	Identifies limitations in outputs.	Evaluates solutions using criteria such as accuracy, bias, and reliability.	Refines solutions systematically and justifies improvements using evidence.
Ethics & Governance	Identifies ethical concerns in AI use.	Conducts structured evaluation of risks (bias, privacy, misuse).	Proposes mitigation strategies and explains their impact.

Phase 4: Grades 9-12

AI SYSTEMS & SOLUTION DESIGNER

Grade/Year: Grade 9/YEAR 10

GRADE 9/YEAR 10 CORE COMPETENCIES:

AI Systems Understanding **AI Workflow Design and Development** **Responsible AI Use** **Evaluation of AI Outputs**

Learning Outcomes			
Strands \ Progression level	**Emerging**	**Proficient**	**Advanced**
AI Systems Understanding	Describes how AI systems use inputs to generate outputs.	Explains how data, tools, and prompts interact within a solution.	Explains how design choices affect output quality and reliability.
AI Solution Design & Development	Uses AI tools to complete structured tasks.	Designs structured AI workflows to solve defined problems.	Refines workflows to improve outputs and usability.
Critical Evaluation & Informed Interaction	Identifies when outputs are incorrect or unclear.	Evaluates outputs for accuracy, bias, and usefulness.	Explains limitations and suggests targeted improvements.
Ethics & Responsible Use	Identifies risks in AI-generated content.	Explains bias, misinformation, and misuse.	Proposes actions to ensure responsible and safe use.

Phase 4: Grades 9-12

AI SYSTEMS & SOLUTION DESIGNER

Grade/Year: Grade 10/YEAR 11

GRADE 10/YEAR 11 CORE COMPETENCIES:

AI Systems Understanding **Systems Thinking and Integration** **AI Solution Design and Development**
Evaluation and Iterative Improvement **Responsible AI Governance**

Learning Outcomes			
Strands \ Progression level	**Emerging**	**Proficient**	**Advanced**
AI Systems Understanding	Describes how different AI tools can be used together.	Explains how components interact as a system.	Evaluates how system design affects performance and reliability.
AI Solution Design & Development	Designs simple AI workflows for specific tasks.	Designs multi-step solutions combining tools and data.	Selects and structures tools strategically to improve performance.
Critical Evaluation & Informed Interaction	Identifies strengths and weaknesses of outputs.	Evaluates solutions using criteria (accuracy, fairness, usefulness).	Refines solutions and explains the impact of improvements.
Governance & Ethics	Identifies ethical concerns in AI use.	Conducts structured evaluation of risks (bias, privacy, misuse).	Proposes mitigation strategies and explains their effectiveness.

Phase 4: Grades 9-12

AI SYSTEMS & SOLUTION DESIGNER

Grade/Year: Grade 11/YEAR 12

GRADE 11/YEAR 12 CORE COMPETENCIES:

AI Systems Thinking and Integration **AI Solution Design and Optimization** **Critical Evaluation and Decision-Making**
AI Governance and Impact Analysis **Human-Centered AI Design**

Learning Outcomes			
Strands \ Progression level	**Emerging**	**Proficient**	**Advanced**
AI Systems Understanding	Describes how AI solutions operate within broader systems.	Explains interactions between data, tools, and users.	Evaluates trade-offs (accuracy, efficiency, usability, reliability).
AI Solution Design & Development	Designs AI-powered solutions for real-world tasks.	Designs structured multi-step solutions addressing user needs.	Optimizes solutions to improve efficiency, usability, and performance.
Critical Evaluation & Informed Interaction	Identifies limitations in solutions.	Evaluates solutions using multiple criteria and evidence.	Justifies improvements using data and structured reasoning.
Governance & Impact	Identifies potential impacts of AI solutions.	Conducts structured analysis of ethical and societal implications.	Proposes responsible-use approaches considering broader impact.

Phase 4: Grades 9-12

AI SYSTEMS & SOLUTIONS DESIGNER

Grade/Year: Grade 12/YEAR 13

GRADE 12/YEAR 13 CORE COMPETENCIES:

AI Systems Thinking and Strategic Design **AI Solution Design and Optimization**
Critical Evaluation and Evidence-Based Decision-Making
Responsible AI Governance and Policy Awareness **Societal Impact and Ethical Leadership**

Learning Outcomes			
Strands / Progression level	**Emerging**	**Proficient**	**Advanced**
AI Systems Understanding	Explains how AI solutions function in real-world contexts.	Analyses how system components interact and influence outcomes.	Evaluates system effectiveness considering performance, risk, and scalability.
AI Solution Design & Development	Designs AI-powered solutions for defined problems.	Designs and refines solutions addressing complex challenges.	Designs integrated, multi-component solutions with strategic intent.
Critical Evaluation & Informed Interaction	Identifies areas for improvement.	Evaluates solutions using evidence and defined criteria.	Justifies refinements using data, evidence, and structured reasoning.
Governance, Ethics & Societal Impact	Identifies ethical and societal risks.	Conducts structured impact analysis (bias, privacy, societal implications).	Designs responsible-use approaches and defends decisions considering impact.