



GRADE 4 • AI OLYMPIAD HANDBOOK

AI Olympiad Handbook

A complete guide for Grade 4 students — the full syllabus, exam pattern, an 8-week preparation strategy, exam-day tips, and the detailed curriculum for every section.

4

SECTIONS (A–D)

35

TOTAL QUESTIONS

40

TOTAL MARKS

60

MINUTES DURATION

1. Syllabus

Section	Topics
A: CT & Logical Reasoning	3D viewpoints, shape flips/turns/rotations/folds/cuts, hidden/missing shapes, mirror images & symmetry, number/shape/letter/mixed patterns, number clues, 3D parts (faces/edges/corners), step-by-step transfers, tables/charts, sorting conditions, grid movements, ordering events, multi-step instructions, counting instructions
B: AI & Technology Concepts	What is AI, AI-enabled devices, human vs. machine, If-Else & decision-making, algorithms, sensors & data, computer vision (face detection, tracking, expression), automation, smart devices, voice control, generative AI
C: Everyday AI Around Us	AI in healthcare, banking, entertainment, agriculture, smartphones, voice assistants, translation, transportation, chatbots, adaptive learning, digital citizenship, online safety, digital footprints, AI ethics, bias, responsible AI, AI for good
D: Elite Thinker	System decomposition, algorithmic pathfinding, 3D spatial modeling, Sense–Think–Act cycle, robotics, AI ethics (privacy, bias), critical analysis

2. Exam Pattern

Section	Title	Questions	Marks	Total
A	CT & Logical Reasoning	10	× 1	10
B	AI & Technology Concepts	10	× 1	10
C	Everyday AI Around Us	10	× 1	10
D	Elite Thinker	5	× 2	10

Total 35 Questions 40 Marks

60 MINUTES DURATION	No NEGATIVE MARKING
-------------------------------	-------------------------------

3. Preparation Strategy

WEEK 1–2: SECTION A (CT & LOGICAL REASONING)

Day	Topic	Activity
Monday	3D Viewpoints	Draw the top, side, and front views of everyday objects (cup, book, bottle).
Tuesday	Mirror Images & Symmetry	Draw half of a picture and complete it using a mirror. Practice both vertical and horizontal symmetry.
Wednesday	Shape Transformations	Fold paper, cut shapes, and predict the outcome.
Thursday	Number Patterns	Find the rule using addition (+), subtraction (–), multiplication (×), or division (÷) in number sequences.
Friday	Shape & Letter Patterns	Practice patterns that combine numbers, shapes, and letters.
Saturday	Mixed Practice	Solve 15 questions covering all topics.

Day	Topic	Activity
Sunday	Rest	—

WEEK 3–4: SECTION B (AI & TECHNOLOGY CONCEPTS)

Day	Topic	Activity
Monday	If-Else Conditions	Write five If-Else statements (e.g., If it is raining → carry an umbrella).
Tuesday	Sensors & Data	List 10 devices with sensors and explain what each sensor detects.
Wednesday	Computer Vision	Learn how a phone detects faces and how a camera tracks objects.
Thursday	Expression Recognition	Show emojis, identify six emotions, and understand how AI recognizes expressions.
Friday	Smart Devices	Compare smart devices with ordinary devices (e.g., TV vs. Smart TV).
Saturday	Section B Test	Solve 10 MCQs and 2 open-ended questions.
Sunday	Rest	—

WEEK 5–6: SECTION C (EVERYDAY AI AROUND US)

Day	Topic	Activity
Monday	AI in Sectors	Research one AI application each in Healthcare, Banking, and Agriculture.
Tuesday	Smart Assistants	Try Google Translate and voice typing; observe how they work.
Wednesday	Chatbots & NLP	Interact with a chatbot and analyze its responses.
Thursday	Digital Citizenship	Create a strong password and discuss digital footprints.
Friday	AI Ethics & Bias	Discuss the case study: "Can AI be unfair?" in a group.
Saturday	Section C Test	Solve 10 MCQs and 2 case-based questions.
Sunday	Rest	—

WEEK 7: SECTION D (ELITE THINKER)

Day	Topic	Activity
Monday	Sense–Think–Act	Map five daily actions using the Sense–Think–Act cycle.
Tuesday	System Decomposition	Break down systems such as a Smart Traffic Light and an ATM Machine into their components.
Wednesday	Algorithmic Pathfinding	Find the shortest path for a drone delivery on a grid.
Thursday	3D Spatial Modeling	Build models with blocks and draw the top, side, and front views.
Friday	AI Ethics Debate	Debate: "Should AI make medical decisions?"
Saturday	Section D Test	Solve five questions by writing complete answers.
Sunday	Rest	—

WEEK 8: FULL MOCKS & REVISION

Day	Activity
Monday	Full Mock Test 1 (35 Questions, 60 Minutes)
Tuesday	Review errors and re-learn weak topics.
Wednesday	Full Mock Test 2 (35 Questions, 55 Minutes)
Thursday	Review errors and focus on Section D.
Friday	Solve a Previous Year Paper.
Saturday	Final Mock Test and light revision.
Sunday	EXAM DAY – All the Best!

4. Daily Routine (25–30 Minutes)

Time	Activity	Duration
Morning	Solve one puzzle (pattern/mirror/grid).	5 min
Afternoon	Learn one topic with an example.	10 min
Evening	Solve five practice questions and one If-Else activity.	10 min
Night	Quick recap by explaining the day's learning to a parent.	5 min

5. Exam Day Strategy

Section	Time	Strategy
A	12 min	Attempt easy questions first and skip complex 3D views initially.
B	12 min	Trust your understanding of If-Else conditions and sensor concepts.
C	12 min	Think of real-world examples while answering.
D	15 min	Write clear answers in 3–4 sentences with proper reasoning.
Review	9 min	Check all answers carefully and correct any silly mistakes.

6. Detailed Curriculum

A CT & Logical Reasoning

Abstract thinking, pattern recognition, decomposition & algorithmic thinking

Abstract Thinking

Visualizing objects from various perspectives and understanding transformations, missing parts, and symmetry.

- 1. Different Viewpoints of 3D Objects:** Visualizing objects from various perspectives, such as the top, front, or right-side views.
- 2. Changes in Shapes:** Understanding how shapes transform after operations like flips, turns, rotations, or cuts and folds.
- 3. Hidden or Missing Parts:** Identifying missing elements in incomplete shapes or patterns to complete the whole idea.

4. Mirror Images and Symmetry: Recognizing identical halves and mirror reflections based on vertical or horizontal symmetry.

Pattern Recognition

- 1. Numbers:** Recognizing sequences governed by arithmetic rules or logical progressions.
- 2. Shapes or Images:** Spotting recurring themes or transformations in geometric figures and visual data.
- 3. Letters:** Understanding alphabetical logic and positional dependencies.
- 4. Mixed Terms:** Identifying patterns that combine numbers, shapes, and letters.

Decomposition

Breaking down a larger problem into a cluster of moderate, manageable clues, applied through:

- 1. Number Clues:** Using place values, sums, differences, and products to decode numerical problems.
- 2. 3D Object Parts:** Analyzing the individual components of a solid, such as its faces, edges, and corners.
- 3. Step-by-Step Transfers:** Tracking the movement or exchange of money, objects, digits, or quantities across multiple stages.
- 4. Tables and Charts:** Interpreting complex visual data sources that contain multiple pieces of interconnected information.
- 5. Conditions for Sorting:** Applying specific rules or constraints to group, count, or sort various items.

Algorithmic Thinking

Following or designing well-defined, elaborate conditions to reach a solution.

- 1. Arithmetic Sequences:** Following simple operations to extend number paths.
- 2. Grid Movements:** Navigating paths or direction-based movements within a grid or map.
- 3. Dynamic Values:** Managing values that consistently increase or decrease across a series of steps.
- 4. Multi-Step Instructions:** Executing elaborate procedures that involve moves, changes, transfers, or swaps (e.g., sorting networks).
- 5. Ordering Events:** Arranging people or events in a specific sequence using chronological clues or shared attributes.
- 6. Counting Instructions:** Following precise procedural rules to determine a total count.

B AI & Technology Concepts

Understanding the core principles of AI and the foundational thinking processes that power smart machines

Foundations of AI

1. What is Artificial Intelligence and how it helps machines perform smart tasks.
2. Identifying AI-enabled devices and applications used in daily life.
3. Understanding the difference between human intelligence and machine intelligence.

How Computers and AI Make Decisions

1. Understanding conditions (If-Else) and decision-making in programs.
2. Recognizing how computers follow instructions and algorithms.
3. Understanding how sensors help machines gather information.

Computer Vision Basics

1. Understanding how cameras help computers "see."

2. Face detection and human detection concepts.
3. Recognizing applications of computer vision such as face tracking and expression recognition.

Smart Technologies

1. Automatic systems such as street lights and voice-controlled devices.
2. Understanding how smart devices use sensors and automation.
3. Generative AI.

C Everyday AI Around Us

Recognizing AI applications in daily life and practicing responsible digital citizenship

AI in Daily Life

1. **Sector-Specific Applications:** Identifying AI use in healthcare (diagnosis), banking (security), entertainment (games), and agriculture.
2. **Consumer Technology:** Recognizing AI in everyday devices like smartphones, voice assistants, and translation tools.
3. **Smart Assistance:** Understanding how smart technologies solve real-world problems in transportation and communication.

AI in Communication and Learning

1. **Language Tools:** Identifying Natural Language Processing (NLP) in tools like chatbots and language translators.
2. **Adaptive Education:** Recognizing how technology-enabled learning uses AI to create personalized knowledge and exploration.

Digital Citizenship and Online Safety

1. **Protecting Information:** Understanding online safety protocols, including creating secure passwords and protecting privacy.
2. **Digital Footprints:** Being aware that online activities leave a "digital footprint" and requiring responsible behavior when using AI tools.

AI Safety and Ethics

1. **Bias Awareness:** Recognizing that AI systems can sometimes produce unfair results (bias) and require human oversight to verify information.
2. **Human-Centered Design:** Ensuring AI is used in a way that respects human interests and focuses on ethical principles.

AI for Good

1. **Solving Global Challenges:** Identifying how technology solves day-to-day problems and supports human welfare.
2. **Societal Impact:** Promoting the use of AI for environmental protection, better healthcare, and innovative transport solutions.

D Elite Thinker

Integrating multi-disciplinary knowledge and advanced reasoning to address complex technological and ethical problems

System Decomposition: Breaking down multi-disciplinary projects into their specific electronic components and coding logic. Students apply the core skill of Decomposition to analyze complex, higher-order problems by separating interconnected conditions and constraints into manageable sub-components.

Algorithmic Pathfinding: Designing optimal movement paths or precise geometric patterns using loops and conditional logic. This requires mastering Algorithmic Thinking to follow and design elaborate procedures, such as navigating grids with path constraints or executing multi-step instructions involving swaps and transfers.

3D Logic & Spatial Modeling: Applying mental transformations, such as rotations and scaling, to create and interpret complex models. This leverages Abstract Thinking to visualize 3-D objects from multiple viewpoints and predict shape outcomes after compound transformations like flips, turns, or specific cuts and folds.

Integrated AI Systems: Analyzing the "Sense-Think-Act" cycle in robotics, where sensors trigger machine intelligence to perform actions. This involves understanding how AI simulates human cognitive processes—such as using Computer Vision to respond to visual information—to solve problems and make automated decisions.

Critical Ethical Analysis: Evaluating real-world scenarios involving privacy, bias, and social responsibility. Students develop Ethical Awareness to recognize when AI reliance requires human supervision, ensuring that technology is used safely, fairly, and in a way that respects human interests and digital citizenship.

