



GRADE 6 · AI OLYMPIAD HANDBOOK

AI Olympiad Handbook

A complete guide for Grade 6 students — the full syllabus, exam pattern, an 8-week preparation strategy, daily routine, exam-day tips, and the detailed curriculum for every section.

4

SECTIONS (A–D)

45

TOTAL QUESTIONS

50

TOTAL MARKS

60

MINUTES DURATION

1. Syllabus

Section	Topics
A: CT & Logical Reasoning	Advanced 3D viewpoints & cross-sections, combined transformations (multiple flips/rotations/folds/cuts), hidden/overlapping parts, multi-axis symmetry, mirror & water images, scale & proportion, mixed operation sequences, multi-attribute patterns (size/position/count/orientation), alternation/skipping/grouping/cyclic patterns, mixed patterns (numbers + shapes + letters), numerical clues (factors, multiples, comparisons), 2D/3D properties (faces, edges, vertices, diagonals, angles), multi-step transfers with conditions, cross-referencing tables/grids/charts, conditional sorting/grouping/elimination, grid navigation (direction, distance, turns, constraints), stepwise value changes, swaps/shifts/transfers/rearrangements, ordering with multiple attributes, logical flow & redundancy identification
B: AI & Technology Concepts	What is AI, computing vs. intelligence, Turing Test (Alan Turing), birth of AI (John McCarthy), AI Winter, AI vs. automation, human vs. machine intelligence (evolution, emotions, algorithms, speed), supervised learning (labeled data), unsupervised learning (unlabeled data), reinforcement learning (rewards/penalties), data types (numerical, text, image, video, sound), Generative AI
C: Everyday AI Around Us	Smart home devices (lights, thermostats), smartphones (Portrait Mode, voice assistants), banking (fraud prevention), healthcare (diagnosis), e-commerce (recommendations), search engines, security & monitoring (face recognition), video games (strategic opponents), drones & smart cars, pattern recognition in daily routines and nature (Fibonacci spiral), online safety, password security, active vs. passive digital footprints
D: Elite Thinkers	Complex logic puzzles (Liar & Truth-teller, rope-length deductions, strategic optimization), ethical reasoning (plagiarism, phishing, hacking, software piracy), intellectual property (copyrights, patents), human-centered AI design

2. Exam Pattern

Section	Title	Questions	Marks	Total
A	CT & Logical Reasoning	15	× 1	15
B	AI & Technology Concepts	15	× 1	15
C	Everyday AI Around Us	10	× 1	10
D	Elite Thinker	5	× 2	10
Total		45		50 Marks



MINUTES DURATION

No

NEGATIVE MARKING

3. Preparation Strategy

Weeks 1–2: Section A (CT & Logical Reasoning)

Day	Topic	Activity
Monday	Advanced 3D Cross-sections	Draw cross-sections of complex 3D objects (e.g., cone, pyramid).
Tuesday	Combined Transformations	Perform multiple flips, rotations, and folds to track the final position.
Wednesday	Multi-axis Symmetry	Identify symmetry across vertical, horizontal, and diagonal axes.
Thursday	Hidden/Overlapping Parts	Find hidden shapes in complex diagrams.
Friday	Scale & Proportion	Enlarge and reduce shapes proportionally.
Saturday	Mixed Operation Sequences	Practice sequences involving +, −, ×, ÷, squares, and cubes.
Sunday	Rest	—

Weeks 3–4: Section A (Continued)

Day	Topic	Activity
Monday	Multi-Attribute Patterns	Solve patterns where size, position, count, and orientation all change.
Tuesday	Alternation/Skipping/Cyclic Patterns	Identify pattern rules with multiple conditions.
Wednesday	Numerical Clues (Factors/Multiples)	Solve puzzles using factors, multiples, and comparisons.
Thursday	2D/3D Properties	Count faces, edges, vertices, diagonals, and angles.
Friday	Multi-step Transfers with Conditions	Solve money or object exchange problems with three or more steps.
Saturday	Cross-Referencing Tables/Grids	

Extract information from complex tables containing five or more data points.

Sunday	Rest	—
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Week 5: Section B (AI & Technology Concepts)

Day	Topic	Activity
Monday	Turing Test & AI History	Research: Who was Alan Turing? What is AI Winter?
Tuesday	AI vs. Automation	Compare a washing machine (automation) with a self-driving car (AI).
Wednesday	Supervised vs. Unsupervised Learning	Compare labeled and unlabeled data by sorting examples.
Thursday	Reinforcement Learning	Explore how AI learns to play chess using rewards and penalties.
Friday	Data Types & Generative AI	Identify text, image, video, and audio data, and learn about Generative AI.
Saturday	Section B Test	Solve 15 MCQs and 2 application-based questions.
Sunday	Rest	—

Week 6: Section C (Everyday AI Around Us)

Day	Topic	Activity
Monday	Smart Homes & Smartphones	List 10 AI features found in your phone or home.
Tuesday	AI in Banking & Healthcare	Research examples of fraud prevention and AI-assisted diagnosis.
Wednesday	E-Commerce & Search Engines	Learn how recommendation systems work.
Thursday	Drones & Smart Cars	Explore the advantages and disadvantages of autonomous vehicles.
Friday	Digital Footprints	Compare active and passive digital footprints and list your own examples.
Saturday	Online Safety & Passwords	Create a strong password and discuss phishing.
Sunday	Rest	—

Week 7: Section D (Elite Thinkers)

Day	Topic	Activity
Monday	Liar & Truth-teller Logic	Solve three logic puzzles of this type.
Tuesday	Rope-length Deductions	Solve complex measurement puzzles.
Wednesday	Strategic Optimization	Solve problems requiring minimum steps and maximum outcomes.
Thursday	Ethical Reasoning	Analyze case studies on plagiarism, phishing, hacking, and software piracy.
Friday	Intellectual Property	Learn about copyrights and patents and why they matter.
Saturday	Section D Test	Solve five questions by writing 4–5 sentence answers with reasoning.
Sunday	Rest	—

Week 8: Full Mocks & Revision

Day	Activity
Monday	Full Mock Test 1 (45 Questions, 60 Minutes)
Tuesday	Deep error analysis and revision of weak topics.
Wednesday	Full Mock Test 2 (45 Questions, 55 Minutes)
Thursday	Review mistakes and focus on Section D.
Friday	Solve a Previous Year Paper under timed conditions.
Saturday	Final Mock Test and light revision.
Sunday	EXAM DAY – You're Ready!

4. Daily Routine (35 Minutes)

Time	Activity	Duration
Morning	Solve one puzzle (transformation or multi-attribute pattern).	5 min
Afternoon	Learn one topic along with its real-world application.	15 min

Evening	Solve five practice questions and one logic puzzle.	10 min
Night	Explain today's topic to someone.	5 min

5. Exam Day Strategy

Section	Questions	Time	Strategy
A	15	16 min	Attempt easy questions first and skip complex transformations initially.
B	15	15 min	Trust your understanding of Machine Learning and AI history.
C	10	12 min	Think about real-world applications while answering.
D	5	12 min	Write step-by-step solutions and 4–5 sentence answers with proper reasoning.
Review	All	5 min	Check all answers carefully and correct any silly mistakes.

TIP

No negative marking – guess if unsure!

6. Detailed Curriculum

A

Computational Thinking (CT) & LR

Abstract thinking, pattern recognition, decomposition & algorithmic thinking

This section applies these four core skills to mathematical and logical problems:

Abstract Thinking:

1. Advanced viewpoints and cross-sections of 3D objects
2. Combined transformation of shapes (multiple flips, rotations, reflections, cuts/folds)
3. Changes in orientation, position, order, and direction (clockwise, anticlockwise, diagonal)
4. Identifying hidden, overlapping, or implied parts in complex visual patterns
5. Symmetry across multiple axes and composite mirror/water image reasoning
6. Visual reasoning involving scale, proportion, and spatial relationships

Pattern Recognition:

1. Numbers with mixed operations and logical rules
2. Shapes/images with changing attributes (size, position, count, orientation)
3. Letters and symbols with positional or alphabetical logic

4. Patterns involving alternation, skipping, grouping, or cyclic behaviour
5. Mixed patterns combining numbers, shapes, and letters with dependency rules

Decomposition:

1. Numerical clues involving place value, operations, factors, multiples, and comparisons
2. Properties of 2D and 3D shapes (faces, edges, vertices, diagonals, angles)
3. Multi-step transfers or exchanges (money, quantities, digits, objects) with conditions
4. Tables, grids, or charts requiring cross-referencing of multiple data points
5. Conditional rules for counting, grouping, sorting, or eliminating possibilities
6. Visual representations that encode numerical or logical values

Algorithmic Thinking:

1. Number sequences formed using combined operations and logical conditions
2. Movement on grids involving direction, distance, turns, and path constraints
3. Stepwise changes where values increase/decrease based on rules
4. Multi-step instructions involving swaps, shifts, transfers, and rearrangements
5. Ordering people, objects, or events using multiple attributes or clues
6. Logical flow of steps, identifying necessary vs redundant information

B**AI & Technology Concepts**

Foundations, history, learning methods, and data fundamentals

Foundations of AI

1. Defining Artificial Intelligence
2. Understanding the role of Computing versus Intelligence.

Historical Milestones

1. Understanding the Turing Test (Alan Turing)
2. The birth of AI (John McCarthy)
3. The AI Winter.

AI vs. Automation

Distinguishing between machines that follow fixed rules (Automation) and those that learn and adapt (AI).

Human vs. Machine Intelligence

Comparing biological evolution and emotional understanding with algorithmic learning and processing speed.

Machine Learning Methodologies

Differentiating between Supervised (labeled data), Unsupervised (unlabeled data), and Reinforcement Learning (rewards and penalties).

Data Fundamentals

Identifying the properties of Numerical (values), Text (words), Image (visuals), Video (moving visuals), and Sound (audio) data types and Generative AI.



Everyday AI Around Us

Practical AI applications and responsible digital citizenship

This section focuses on the practical application of AI in daily life and the principles of responsible digital citizenship.

Real-World Applications

Recognizing AI in Smart Home Devices (lights, thermostats), Smartphones (Portrait Mode, voice assistants), Banking (fraud prevention), Healthcare (diagnosis), E-Commerce (recommendations), and Search Engines.

Advanced Everyday Tools

Understanding the impact of AI in Security & Monitoring (face recognition), Video Games (strategic opponents), and Drones & Smart Cars (autonomous vehicles).

Patterns and Decision Making

Identifying repeating patterns in daily routines, schedules, and nature (such as the Fibonacci spiral) to make predictable observations and conclusions.

Ethics and Digital Responsibility

Practicing online safety, maintaining privacy, and following protocols for password safety.

Digital Footprints

Evaluating the permanent record left by online activities, including Active (intentional choices like posting) and Passive (unintentional trails like location data) digital footprints.



Elite Thinkers (Advanced HOTS)

Complex problem solving, ethical reasoning, and intellectual property

Complex Problem Solving

High-order tasks from "The Thinking Spot," such as the "Liar and Truth-teller" logic, rope-length deductions, and strategic optimization puzzles.

Ethical Reasoning

Analyzing dilemmas related to Plagiarism, Phishing, Hacking, and Software Piracy.

Intellectual Property

Understanding Copyrights, Patents, and the importance of human-centered design in AI.

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