

INDIA'S NATIONAL SCHOOL CHAMPIONSHIP · 2026-27

BUILDATHON

*Mission Bharat 2047
Build the India you'll live in.*

500+ SCHOOLS

GRADES 3-12

3 ROUNDS

24 THEMES

₹100 / STUDENT / CHALLENGE



Machines
ROBOTICS

Code
CODING

Signals
HACKATHON

Minds
ARTIFICIAL INTELLIGENCE

IN ASSOCIATION WITH

ACADEMIC
IIT Bombay
IIT Delhi

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A note on what this book is

Everything here is binding for the 2026–27 championship. Where a date or a number is still being confirmed it is marked **TBC**. The Organising Committee will publish any change at least 21 days before it takes effect.

THE THEME

Mission Bharat 2047

Build the India you'll live in.

In 2047 India turns a hundred. The students in this championship will be between thirty-three and forty-two years old. They will not be reading about that India. They will be running it.

So the mission is not to build a school project. It is to look hard at one real thing that does not work well enough — the water, the traffic, the air, the alarm that nobody trusts, the machine that was never designed for your grandmother — and to build something that makes it work better.

Every challenge in this book hangs off that single instruction. Everything else is detail.

HOW THE MISSION IS ORGANISED

4

Ministries

One per category. Each issues three briefs — one for each age band.

24

Themes

Six per ministry. Each is a problem *space*, wide enough for two hundred different answers.

3

Rounds

Online calibration, regional build, national final. Each tests a different thing.

A theme is a space, not a project

"The Water We Share" is a theme. "Build a soil-moisture irrigation controller" is a project. This book never gives you the second kind. Under every theme you will find example directions — those are there to show you how wide the space is, and **you earn nothing extra for building one of them**. The entries that win are the ones nobody on the committee thought of.

THE CHAMPIONSHIP IN ONE PAGE

At a Glance

500+

SCHOOLS

4

MINISTRIES

24

THEMES

3

AGE BANDS

₹0

TO PRACTISE

The journey



The four ministries

- Machines**
Robotics · circuits, sensors, rovers
- Code**
Coding · blocks and Python
- Signals & Secrets**
Hackathon · the cipher hunt
- Learning Machines**
AI · train it, then question it

The three bands

- Junior**
Grades 3–5
Rounds 1 and 2
- Middle**
Grades 6–8
All three rounds
- Senior**
Grades 9–12
All three rounds

You do not need any hardware

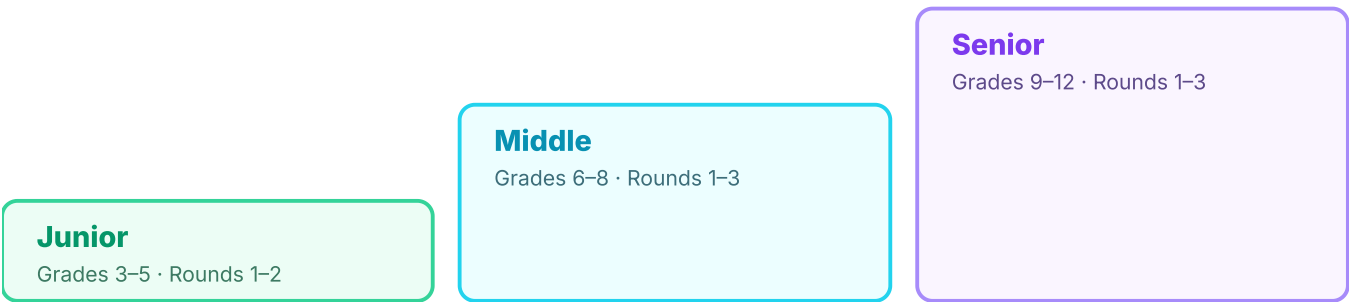
Every one of the 24 themes — including all six in Robotics — can be built end to end in a browser. The Curious Labs Circuits and Arduino studios simulate sixteen sensors, motors, servos, relays and displays. A school with no robotics lab competes on exactly the same terms as a school with one. Centres that own hardware may run a physical demonstration alongside; it is scored on the same rubric and earns no extra marks.

ELIGIBILITY

Who Can Enter

Any student in Grades 3 to 12 at a registered school. Entry is through your school, and your school registers once for every student it enters.

The three bands



The rules of entry

Who	Any student in Grades 3–12 at a registered school.
How many categories	All four, if you want. Each is scored separately and you may reach the Regionals in more than one.
Band	Set by the grade you are in when your school registers , and it does not change afterwards — not even when the new session starts in April.
Round 1	Solo. Always.
Round 2	Machines and Signals & Secrets become teams of three. Code and Learning Machines stay solo.
Where the theme comes from	Machines: announced when the round opens, so you may build at home and bring it. All other ministries: drawn on the morning and built on the day.
Teams	All three members from the same school and the same band.
Teams in more than one	Yes. The same three students may enter as a team in <i>Machines</i> and in <i>Signals & Secrets</i> , and each of them may also enter <i>Code</i> and <i>Learning Machines</i> individually. Nothing stops a group competing across every ministry.

Where the Junior journey ends

Grades 3–5 compete in Round 1 and in the Regionals. **They do not go to Nationals.**

Every zone crowns Junior champions in all four ministries, with the same ceremony, the same trophy and the same stage as the older bands. It is an arrival, not an exit.

What you need

- A computer or tablet with a browser
- An internet connection for Round 1 — it does not need to be fast
- A Curious Labs login, which your school gives you
- Nothing else. No kit, no licence, no install.

Practice is open now

Every studio and the whole practice arena are already live and free at learn.curiouslabs.online. Students who work through the practice trails will have met every idea Round 1 uses.

PART TWO

The Four Ministries

Each ministry is one category of the championship. It issues **three briefs** — one for each age band — and opens **six themes**. The brief tells you what kind of thing to make. The theme tells you what corner of the mission to make it in.



Machines

ROBOTICS

Things that sense the world and then do something about it. Circuits, sensors, motors, servos and a rover on a mat.

Water · Energy · Safety · Movement · Weather · Access



Code

CODING

Programs that take something messy and true about the world and turn it into an answer. Blocks for Junior, Python above.

Data · Routes · Money · Language · Pattern · Fairness



Signals & Secrets

HACKATHON

A treasure hunt made of ciphers. Somebody hid something; find it, then learn to hide something yourself.

Six vaults of The Ashoka Cipher



Learning Machines

ARTIFICIAL INTELLIGENCE

Train a real model on real data — then find out who it works for, who it fails, and whether it can explain itself.

See · Listen · Read · Choose · Fairness · Explain

How to read the next twelve pages. Each ministry gets three: its *briefs* (what each band is asked to make), its *themes* (the six spaces you may make it in), and its *challenges* (exactly what happens in each round, band by band).



MINISTRY ONE · ROBOTICS

The Ministry of Machines

Things that sense the world and then do something about it. You will work in the **Circuits studio**, the **Arduino studio** and on the **rover mat** — all three in your browser, with sixteen simulated sensors, motors, servos, relays, buzzers and lights.

The three briefs

Your band's brief applies to whichever of the six themes you are working in. It is the shape of the thing you must make.

JUNIOR

Grades 3–5

“Make a machine that notices something, and does something about it.”

One sensor is enough. One output is enough. What the judges want to see is that the machine reacts to the *right* moment — not too early, not too late.

MIDDLE

Grades 6–8

“Make a machine that decides — and can explain the number it decided on.”

Somewhere in your machine is a threshold: `if moisture < 300, if distance < 20`. You must be able to say why it is that number and not another one. “It felt right” is not an answer. “We tested nine values and below 300 it watered dry soil” is.

SENIOR

Grades 9–12

“Make a machine that keeps working when one of its senses starts lying.”

Real sensors drift, stick, spike and die. A Senior entry is expected to have a defined behaviour for each of those — a safe state, a fallback, a confirmation step, a declared limit. You will be asked about it, and you will be asked to demonstrate it.

Your bench — what the studios give you

LDR light PIR motion IR obstacle Soil moisture DHT temp + humidity LM35 temp Water level
 Gas Flame Touch Tilt Rain Sound Ultrasonic distance Hall / magnet Bluetooth
 Servo DC motor Relay RGB LED Buzzer Potentiometer Serial log WiFi

Plus the **rover mat** — 240 × 180 cm, where one unit is one centimetre, so the numbers you program online are the same numbers you would use on a real mat.

MINISTRY OF MACHINES

The Six Themes

Directions are shown to prove how wide each space is. **They are not a list to choose from** — you score nothing extra for matching one.

The Water We Share

M1

Every drop, from the tap to the field to the flood.

Anything that senses, saves, moves, warns about or shares water.

Directions: tank overflow · leak detection · irrigation timing · flood warning · water quality · the queue at a shared handpump · rainwater harvesting · tracking who gets water and when.

Power Without Waste

M2

Energy that goes where it is needed and nowhere else.

Generating, measuring, saving or fairly sharing energy and light.

Directions: a corridor that lights only when walked · solar panel angling · classroom auto-off · a study light where the grid is unreliable · load-shedding priorities · making a bill visible · light for a street with no pole.

The Alarm That Was Right

M3

Noticing danger early — and being believed when you do.

The hard part is not detecting. It is not crying wolf.

Directions: gas leak · fire and smoke · a cylinder tipping · intruders · a child or animal left behind · manhole and site hazards · evacuation · an alarm people actually trust.

Getting There Safely

M4

Moving people and things through a space without harm.

The only theme where the rover mat is likely to be your main stage.

Directions: an unmanned level crossing · parking guidance · a bus door that knows · traffic that adapts to who is waiting · a conveyor · a queue that moves · getting a wheelchair over a step · last-mile delivery.

Air, Weather and What We Grow

M5

Measuring the world outside, and acting on what it says.

This theme rewards logging over time more than any other.

Directions: classroom air quality · a school weather station · a greenhouse that regulates itself · cold chain for milk or vaccines · grain-storage humidity · a heatwave warning for a worksite · predicting rain from your own data.

The People Technology Forgets

M6

Machines for the users a standard design leaves out.

Assistive and inclusive technology — disability, age, illness, or anyone the default excludes.

Directions: a doorbell you feel instead of hear · a cane that senses ahead · medicine reminders · a call button that actually reaches someone · one-switch control · a communication board · help for someone who has fallen · a kitchen tool for one hand.

If you choose M6, read this

Build it for a *named* person with a real difficulty — someone you know, or someone you have actually spoken to. Judges are briefed to reward respect and specificity, and to mark down entries that use disabled people as decoration for a gadget.

MINISTRY OF MACHINES

The Challenges

Exactly what happens in each round, band by band.

BAND	ROUND 1 · ONLINE	ROUND 2 · REGIONALS	ROUND 3 · NATIONALS
JUNIOR Grades 3–5	Light It Up Eight circuit challenges in the Circuits studio, each checked automatically by the simulator the moment it works: light an LED, add a switch, two lights at once, spin a motor, make it buzz, dim the light, push to shine, and a light-and-sound show. Then one build of your own — any machine that notices something — filmed and uploaded. 120 minutes · solo · auto-graded	Bring it, or build it here Your theme is announced when the round opens, so your team of three may build at home and bring it — digital, physical, or both. Teams who prefer to build on the day get the full four hours in the studio. Afternoon surprise task, 90 minutes, on the day: <i>“now let someone switch it off from across the room.”</i> Entry Card required	<i>The Junior journey ends at the Regionals, with a full zone ceremony and Junior champions in every ministry.</i>
MIDDLE Grades 6–8	Rescue Rover Program the rover across the 240 × 180 cm mat: reach five markers, avoid the rubble, return to base, all inside a move budget. Your course layout is generated for you alone — no two students get the same one. Plus six sensor-logic circuit challenges: make a light, a motor and a buzzer respond to the right reading. 120 minutes · solo · auto-graded	Bring it, or build it here Theme announced at round open — build at home and bring it, or build on the day. Your machine must decide something, and your Entry Card must name the threshold and why that number. Surprise task, on the day: <i>one of your inputs is disabled thirty minutes in.</i>	Bring · Break · Defend Themes announced in advance — bring your machine built. Day one is a six-hour <i>extension</i> against a constraint revealed on the spot. Day two: attack another team's machine, then defend your own.
SENIOR Grades 9–12	Closed Loop Arduino sketch challenges built on sensor traces generated for you: debounce a noisy button, ramp a PWM output, build a threshold with hysteresis so it stops chattering, write a four-state machine — and one trace that is already failing, which you must diagnose. 120 minutes · solo · auto-graded	Bring it, or build it here Theme announced at round open — build at home and bring it, or build on the day. Your machine must log its own decisions; the log is part of what is judged. Surprise task, on the day: <i>an adversarial input set. Make it fail. Then make it not fail.</i>	Bring · Break · Defend Bring your machine built. Day one extends it against a live constraint; graceful degradation is mandatory and it must have a declared safe state. Day two viva is on your control loop — a finalist who cannot explain their own loop does not win.

Why no two students get the same Round 1

Every rover course, sensor trace and circuit target is generated from your own login. The student next to you is solving the same *kind* of problem with different numbers. Sharing a method helps you both. Sharing an answer helps nobody.

Build at home — and bring it

Machines is the one ministry where the Regional and National builds may be **made at home and carried in**, in hardware or on screen. Because of that, the Machines theme is announced when the round opens, not drawn on the morning — and the **surprise task and the viva** are what confirm the work is the student's own.

MINISTRY TWO · CODING



The Ministry of Code

Programs that take something messy and true about the world and turn it into an answer.

Junior works in the Blocks studio. **Middle** and **Senior** write real Python, running in the browser — nothing to install.

The three briefs

JUNIOR

Grades 3–5 ·
Blocks

“Make something playable that teaches somebody something true.”

It has to be playable — someone who has never met you must be able to pick it up and understand it. And the thing it teaches has to be *true*: a real number, a real rule, a real fact about the world.

MIDDLE

Grades 6–8 ·
Python

“Turn messy real numbers into an answer somebody could act on.”

Data in the real world has gaps, typos and impossible values. Your program has to survive them and still produce something a person could make a decision with — plus one chart that does not mislead.

SENIOR

Grades 9–12 ·
Python

“Write something that survives bad input — and prove that it does.”

Anybody can write code that works on the example. A Senior entry is expected to handle the empty file, the wrong type, the value ten times larger than you planned for — and to show the test that proves it.

Why Senior Round 1 asks you to read code, not only write it

Almost every coding olympiad in the country tests whether you can write a program. Very few test whether you can read somebody else's broken one and find out why it fails — which is most of the actual job, and which you cannot cram for. Three of the fifteen Senior problems are debugging problems, and they carry the heaviest marks.

MINISTRY OF CODE

The Six Themes

Each theme suits a different family of skills — but any of them can be answered by any band, in blocks or in Python.

My Town in Numbers

C1

Everything true about where you live is a dataset.

Directions: rainfall · bus punctuality · shop prices · attendance · waste collection · water supply hours · temperature over a year · potholes · anything you can count on your own street.

Skills: aggregation, filtering, averages that do not lie, one honest chart. **Junior:** a counting or sorting game about the town.

From Here to There

C2

A to B is a harder problem than it looks.

Directions: bus routing · school-run planning · a maze · train connections · delivery ordering · evacuation paths · cheapest journey versus fastest · a puzzle game about getting through.

Skills: search, greedy versus optimal, graphs done gently, pathfinding. **Junior:** a maze or navigation game.

The Price of Everything

C3

Money, stock, and what happens when both run out.

Directions: a shop that runs out · price across a season · a budget that must balance · barter · a vending machine · a crop sold at the right moment · the cost of waste · a game economy.

Skills: state over time, simulation, loops with consequences. **Junior:** a shop or vending-machine game.

Twenty-Two Tongues

C4

India writes in a dozen scripts. Make the computer keep up.

Directions: transliteration · word games in your own language · a spelling helper · letter frequency across scripts · rhymes and poetry · a dictionary · a cipher of your own · detecting which language a line is in.

Skills: strings, character handling, frequency, the reality of Unicode. **Junior:** a word or rhyme game in your own language.

Patterns That Repeat

C5

Kolam, jaali, block-print, tala — India has been writing algorithms for centuries.

Directions: kolam and rangoli generators · jaali screens · textile repeats · fractals · a rhythm or tala machine · symmetry explorers · tessellation · generative art from local motifs.

Skills: loops, nested loops, coordinates, recursion, parameters. **Junior:** pen-drawn patterns — this is where Junior coding shines.

Whose Turn Is It?

C6

Who gets served first, and who decides?

Directions: a clinic queue · exam seating · sharing one computer lab · splitting a bill · ration distribution · tournament fixtures · roster rotation · a timetable · deciding whose turn it is when everyone claims it is theirs.

Skills: sorting, priority, constraints, and an explicit definition of “fair”. **Junior:** a turn-taking game.

If you choose C6, one extra rule

Write your definition of “fair” down, in words, *before* you write any code — it goes on your Entry Card. Half the learning in this theme is discovering that fairness has several definitions and they disagree with each other.

MINISTRY OF CODE

The Challenges

Exactly what happens in each round, band by band.

BAND	ROUND 1 · ONLINE	ROUND 2 · REGIONALS	ROUND 3 · NATIONALS
JUNIOR Grades 3–5 Blocks	Make It Move Ten block puzzles, each with a goal the computer can check by <i>running</i> your project, not by reading it: get the sprite to the flag, draw the shape, keep the score at exactly seven, make it repeat without stopping. Every puzzle is generated with different targets for every student. 120 minutes · solo · auto-graded	Tell It in Ninety Minutes A theme is drawn at 8:30. You build a playable one-screen game or interactive story in the Blocks studio. Judged on <i>does it work</i> first and <i>is the idea yours</i> second. Surprise task: <i>now make it playable using only one key.</i>	<i>The Junior journey ends at the Regionals.</i>
MIDDLE Grades 6–8 Python	Twelve Questions Twelve Python problems over a small generated dataset about a town that does not exist — its rainfall, its bus times, its shop stock. Loops, conditions, lists, one aggregate, and one deliberate off-by-one trap. Your town's numbers are generated for you alone. 120 minutes · solo · auto-graded	The Broken Dataset Theme drawn at 8:30. A dirty dataset lands at 9:00 and must become three defensible answers and one chart, in four hours. Surprise task: <i>a new column appears that contradicts one of your answers.</i>	Build · Break · Defend Two themes fused live. Six hours to build a tool that takes input and recommends an action, printing its reasoning. Day two: break another finalist's tool, then defend yours on edge cases.
SENIOR Grades 9–12 Python	The Cost of Being Wrong Fifteen problems in three tiers — implementation, then algorithmic (sorting, search, greedy, light dynamic programming), then three debugging problems : working code that passes the sample and fails in production, with the failing input generated for you. 120 minutes · solo · auto-graded · time is the tiebreak only	Ship in Four Theme drawn at 8:30. Four hours to a working tool that handles malformed input without crashing — and you must submit the test that proves it. Surprise task: <i>ten times the input size. Five minutes.</i>	Build · Break · Defend Two themes fused live. Day two includes a code-reading viva: a judge picks one function from your submission and you explain every line of it.

Which language, and which version

Python in your browser — no install, identical for every student. Blocks for Junior. No other language or editor in Round 1.

On time limits

Your 120 minutes start when you open the arena, any time in the ten-day window. Speed only separates identical scores — it is never a score itself.



MINISTRY THREE · HACKATHON

Signals & Secrets

THE STORY

The Ashoka Cipher

A message was once broken into six fragments and hidden across the country — each one locked inside a different *kind* of secret-keeping. Symbols. Numbers. Order. Keys. Proof. And, last, a lock whose key can be published on a wall without ever giving the message away. Six vaults. Six fragments. One key. The vaults are open. Nobody has assembled all six.

The three briefs

JUNIOR

Grades 3–5

“Find what was hidden — and show how you knew.”

Guessing the answer earns the points. Explaining the method earns the round. Every Junior stage asks you to say, in one line, what told you the trick.

MIDDLE

Grades 6–8

“Crack it without the key. Then hide something of your own.”

From the Regionals onwards you stop being only a solver. You design a hunt for another team — which is much harder, because you cannot build a good puzzle out of a method you only half understand.

SENIOR

Grades 9–12

“Break it. Then build one that cannot be broken the same way.”

Senior work is expected to name the weakness it exploited — a repeating key, an unsalted hash, a predictable seed — and then to show a design that closes it.

What this ministry is not

Nothing in this category involves attacking a real computer, a real account or a real network. Every puzzle is a self-contained artefact generated by Curious Labs for you. Attempting anything against live systems — ours or anyone else's — is an immediate and permanent disqualification for the student and, if a coach was involved, for the school. See page 25.

THE ASHOKA CIPHER

The Six Vaults

Each vault is a family of secret-keeping. Every band meets all six — at its own depth.

The Rock Edict

S1

One mark standing for another.

Symbol ciphers, pictographs, keyed alphabets, the flipped alphabet, first-letter secrets, and messages hiding in plain sight.

Symbols

Caesar

Atbash

Acrostic

The Pillar Count

S2

Meaning hidden inside a number.

Counting codes, binary, hexadecimal, base conversion, character codes, positional tricks and numeric keys.

Binary

Hex

Base64

ASCII

The Merchant's Ledger

S3

Nothing changed — only rearranged.

Rail fence, route and columnar transposition, checksums, error detection, and a record somebody has quietly tampered with.

Rail fence

Transposition

Checksums

The Monsoon Signal

S4

Messages over distance, with a shared secret.

Keyword ciphers, frequency analysis, crib dragging, XOR streams — and a repeating key that gives itself away.

Vigenère

Frequency

XOR

The Mint and the Forgery

S5

Making something impossible to fake.

Recognising a hash, dictionary attacks, why salt changes everything, proof of work, integrity, and spotting a counterfeit record.

Hashing

Salt

Proof of work

The Sealed Chamber

S6

Two keys — and one of them is public.

Small-scale RSA, key exchange, signatures, identity. The finale needs a fragment from every other vault.

Public key

RSA

Signatures

Finale

At the Regionals, the vaults leave the screen

Codes are hidden across the venue. You scan them with the Curious Labs app itself — no other scanner is permitted — and each scan unlocks the next stage of your vault against your own login. Expect at least one decoy, and expect reading it to cost you.

SIGNALS & SECRETS

The Challenges

Exactly what happens in each round, band by band.

BAND	ROUND 1 · ONLINE	ROUND 2 · REGIONALS	ROUND 3 · NATIONALS
JUNIOR Grades 3–5	The First Six Stages A chained trail through all six vaults, one stage each, ending in a three-key finale. Each stage unlocks the next. Hints are available and priced — taking one costs points from that stage only, and you may read it again afterwards for free. 120 minutes · solo · auto-graded	The Campus Hunt Teams of three. Codes hidden across the venue, scanned with the Curious Labs app; each scan opens the next stage. Two hours. Then, in the afternoon: <i>hide one of your own, and watch another team try it.</i>	<i>The Junior journey ends at the Regionals.</i>
MIDDLE Grades 6–8	Eight Stages Cracking a shift with no key given, the flipped alphabet, the fence, the keyword lock, robot speech, the postcard wrapper, the broken courier — and a double-locked finale. Every ciphertext is generated from your own login. The student beside you is solving the same <i>kind</i> of puzzle with different letters. 120 minutes · solo · auto-graded	Signal and Noise Teams of three. Intercepted transmissions hidden around campus — one of them is a decoy, and opening it costs you. Morning solve, afternoon build: design a two-stage hunt for another team.	The Vault A six-hour multi-stage hunt where stages unlock <i>in parallel</i> , so a team has to split up and trust each other's working. Then build, break and defend, like every other ministry.
SENIOR Grades 9–12	Eight Stages, No Mercy A hex dump, an XOR stream, Vigenère with no crib, naming a hash from its shape, a dictionary attack, the same hash now salted, proof of work, and small-scale RSA. Grades 11–12 continue into an extension set: block-cipher modes, a format flaw, and a gently-taught timing side channel. 120 minutes · solo · auto-graded	Cold Storage An encrypted archive and a set of physical artefacts; neither opens without the other. A surprise stage lands ninety minutes in. Afternoon: build a vault of your own that states which weakness it closes.	The Vault Includes one stage that <i>cannot</i> be brute-forced in the time available — only reasoned through. Day two: attack another team's vault and defend your own design to the jury.

Hints, and what they cost

Two or three hints per stage at a published price, charged once, to that stage only. Taking a hint is a tactic, not a confession.

Tools you may use

Anything you like — paper, a calculator, your own Python. Not another person's answer — which would not fit your lock anyway.



MINISTRY FOUR · ARTIFICIAL INTELLIGENCE

Learning Machines

You will train real models on real data in the Neural Lab — image, sound, pose, object and text classifiers, clustering, nearest-neighbour, and the tools to take your own model apart afterwards.

The three briefs

JUNIOR

Grades 3–5

“Teach a machine to help someone — then find the one thing it gets wrong.”

Finding the mistake is not failure. It is the second half of the task, and it carries marks.

MIDDLE

Grades 6–8

“Train it, then prove who it works for and who it doesn’t.”

A model that is 92% accurate is 100% wrong for somebody. Your job is to find out who, show the evidence, and say it out loud.

SENIOR

Grades 9–12

“Ship a model with a published model card, and defend your choice of metric.”

Your card must state the intended use, an explicitly *out-of-scope* use, the data it learned from, and a measured failure mode. A finalist who says “we used accuracy” and cannot justify it will not place.

The rule that makes this ministry different

Fairness and explanation are scored on every entry, whatever theme you drew. Four of the six themes are domains — seeing, listening, reading, choosing. The other two are *lenses*, and they are applied to all of them. In this championship, finding your own model’s bias is worth more than raising its accuracy by two points. That is deliberate, and it is the whole point.

About data and people

If your project collects data from real people — faces, voices, handwriting, answers — you must have asked them, they must be able to say no, and you must not submit the raw data with your entry. Your Entry Card states whose data it was and how you asked. Entries that cannot answer that are withdrawn.

LEARNING MACHINES

The Six Themes

Four domains and two lenses. You draw one — but the two lenses are applied to your entry whichever one you drew.

Teaching a Machine to See

A1

Anything a machine ought to be able to look at and understand.

Directions: sorting waste · spotting a crop problem · counting · reading a meter or a form · recognising a sign · an attendance aid · quality checking · noticing that something has changed.

Teaching a Machine to Listen

A2

Anything it should hear — and anything it should say back.

Directions: a spoken command in your own language · a sound that means trouble · reading text aloud for someone who cannot read it · birdsong or machine noise · music · a voice interface for someone with no keyboard.

Machines That Read and Write

A3

Anything made of words.

Directions: sorting messages · spotting a scam · sentiment on real comments · translation between Indian languages · summarising · answering from a document · autocomplete · what a tokenizer does to Devanagari.

The Machine That Chooses

A4

Anything it recommends, ranks, filters or decides.

Directions: what to watch or read next · which student needs help first · sorting applications · a filter bubble you can watch forming · matching people to resources · finding the feedback loop it creates in itself.

Who It Leaves Out

A5 · lens

Every model helps somebody and costs somebody. Name both.

Take any domain and interrogate it: skewed training data · a threshold that quietly excludes a group · accuracy that hides failure on a minority · consent, and whose data it was · a hiring, admission, loan or selection model examined honestly.

Show Your Working

A6 · lens

A model that cannot explain itself has not finished.

Why did it predict that · which pixels or words decided it · did it learn or did it memorise · what the confusion matrix actually says · a published model card · a machine that says “I don’t know” instead of guessing.

Why two of the six are lenses

Because a competition that only rewards accuracy teaches children to chase a number and stop thinking. A team that draws *Teaching a Machine to See* still has to answer who their model fails and how it decided — and a team that draws a lens applies it to a domain of their own choosing.

LEARNING MACHINES

The Challenges

Exactly what happens in each round, band by band.

BAND	ROUND 1 · ONLINE	ROUND 2 · REGIONALS	ROUND 3 · NATIONALS
JUNIOR Grades 3–5	Teach the Machine A guided run through the image and pose trainers with checkpoints the platform marks: train a three-class model, get it right on held-out examples the platform supplies, and then answer five picture questions about <i>why</i> it got one of them wrong. 120 minutes · solo · auto-graded	The Kind Classifier Theme drawn at 8:30. Three hours to train a model that helps somebody — sorting recycling, spotting a raised hand, naming a leaf — and then to show one thing it gets wrong and say why. The “say why” is judged as heavily as the model.	<i>The Junior journey ends at the Regionals.</i>
MIDDLE Grades 6–8	The Bias Hunt Train a classifier, then hunt. The platform hands you a dataset that has been deliberately skewed — you must find the skew, show it with the balance and accuracy tools, and report what it does to the model. Marked against the skew that was actually planted. Your dataset's skew is chosen for you alone. 120 minutes · solo · auto-graded	Whose Data? Theme drawn at 8:30. Four hours to collect your <i>own</i> small dataset at the venue, train on it, test it, and write a one-page honest model card. <i>Surprise task: the judges test your model on a group you did not collect from.</i>	Build · Break · Defend Two themes fused live. Six hours for a working model <i>plus</i> a documented failure analysis — the analysis is worth more than the accuracy. Day two viva is on your confusion matrix.
SENIOR Grades 9–12	Model with a Conscience Three tiers. Train and evaluate with precision and recall, not accuracy alone. Then move a decision threshold and account for exactly who that helps and who it harms. Then explain a single prediction — which feature decided it. Datasets are generated per student. 120 minutes · solo · auto-graded	Deploy It Theme drawn at 8:30. Four hours to an end-to-end system with a stated intended use, a stated out-of-scope use, and a <i>measured</i> failure mode. <i>Surprise task: an adversarial input set.</i>	Build · Break · Defend Two themes fused live, with a published model card required. Day two viva with academic partners: defend your choice of metric. This is where the title is decided.

What a model card is

One page: what the model is for, what it is *not* for, what it learned from, how well it does and on whom, and what it gets wrong. Template in the arena.

Everything runs in your browser

Training happens on the machine in front of you. No cloud account, no API key, no paid service.

PART THREE

The Three Rounds

The three rounds are deliberately different *kinds* of test. One measures skill, one measures application, one measures invention. A student who is only good at one of them will not reach the end — and that is the point.



How many go through

STAGE	SCHOOLS	STUDENTS	HOW THEY ARE CHOSEN
Round 1	500+	every entrant	Anyone whose school registers. No qualification needed.
Regionals	~280	~2,400	Round 1 rank <i>within your zone</i> , plus the best in each school, plus a wildcard pool. See below.
Nationals	~90	~192	Regional winners and runners-up, Middle and Senior bands only.

Why we do not simply take the national top 2,400

Because that would hand the whole championship to a handful of big-city schools, and it would tell a first-time school in a small town that there was never any point entering. Regional places are allocated three ways: **60%** by rank within your own zone, **25%** to the best entrant in each school, and **15%** from a wildcard pool that the committee uses to keep first-time schools, smaller towns and girls' participation properly represented. The exact allocation is published before Round 1 opens, and it does not change afterwards.

1

ROUND ONE · ONLINE

Calibration

Every entrant in the country, from their own school or their own home, on **learn.curiouslabs.online**. Marked entirely by machine — which is the only honest way to grade thirty-six thousand students in ten days.

How it runs

A window, not a sitting. The arena is open for **ten days**. You take your **120 minutes** any time inside it. The clock starts when you open the arena, and it runs on our server, not your browser.

Solo. Always. No teams in Round 1, in any ministry.

Enter as many ministries as you like. Each has its own 120 minutes and its own score.

If your connection drops, your progress is already saved on the server. Log back in and carry on inside the same window.

How it is marked

Every challenge is generated for you alone, from your own login. Your neighbour is solving the same *kind* of problem with different numbers.

Points per challenge, with hints available at a published price. Taking a hint costs points on that challenge only.

Scores are normalised inside your band. A Junior score and a Senior score are never compared.

Time is the tiebreak only — never a score in itself. This is a test of thinking, not of your school's broadband.

What Round 1 looks like in each ministry

MINISTRY	JUNIOR · 3–5	MIDDLE · 6–8	SENIOR · 9–12
Machines	Light It Up	Rescue Rover	Closed Loop
Code	Make It Move	Twelve Questions	The Cost of Being Wrong
Signals & Secrets	The First Six Stages	Eight Stages	Eight Stages, No Mercy
Learning Machines	Teach the Machine	The Bias Hunt	Model with a Conscience

Full detail for each of these is on the ministry pages — see pages 09, 12, 15 and 18.

What your school must do before the window opens

Complete **both dry runs**. One four weeks before, one the week before. They take twenty minutes, they use the real arena, and they exist so that a browser problem, a login problem or a firewall problem is found on a Tuesday in practice rather than in the middle of a child's attempt. A school that has not completed a dry run will get a phone call, not a disqualification — but we would rather make the call early.

2

ROUND TWO · REGIONALS

Application

One day, at a partner campus, in one of twelve zones. Everything runs on the Curious Labs platform; the venue supplies the clock, the pressure and the audience.

The day

08:30

The draw

09:00 – 13:00

The build · four hours

14:00 – 15:30

Surprise task

16:00

Judging & ceremony

The draw — and the one exception

For **Code, Signals & Secrets** and **Learning Machines**, your theme is **drawn on stage at 08:30** and built that day. It is drawn on the morning precisely so that it cannot be built at home in advance.

Machines works differently. Its theme is **announced when the round opens**, weeks ahead. You may build your machine at home — in hardware, on screen, or both — and carry it in. Teams who would rather build on the day get the full four hours in the studio instead.

In Machines, the surprise task and the viva are what confirm the work is the student's own.

Teams

Machines and **Signals & Secrets** run as **teams of three**. All three from the same school and the same band.

Code and **Learning Machines** stay **solo**.

A group may enter more than one ministry. The same three students can be a team in **Machines** *and* in **Signals & Secrets**, and each of them can still enter **Code** and **Learning Machines** individually. Nothing stops a group competing across all four.

The surprise task

Ninety minutes, revealed after lunch, never published in advance. It changes your build under you: *"now let someone switch it off from across the room", "ten times the input, five minutes", "the judges will test your model on a group you did not collect from."*

It carries **25 of the 100 marks** — the heaviest single item after the build itself. It is what separates a child who built the thing from a child whose uncle did.

What you hand in

Your build, saved in the studio — and your **Entry Card**, filled in on the platform. Four boxes. See page 23.

Submissions close on the clock. Unlike homework on the platform, a competition entry hard-closes at the deadline and late work is not accepted.

Judging is on tablets, against the published rubric, by two judges who cannot see your school's name.

Junior band: this is the summit, and it is treated as one

Grades 3–5 finish their championship here. Every zone crowns Junior champions in all four ministries, on the same stage, with the same trophies and the same ceremony as the older bands. It is an arrival, not an exit.

3

ROUND THREE · NATIONALS

Build • Break • Defend

Two days, one national campus, Middle and Senior bands. Three acts — and the second one is the part no other school championship in the country runs.

I

Build — Day One, six hours

Two themes are drawn live and fused. *"The Water We Share × Who It Leaves Out."* *"The Alarm That Was Right × Twenty-Two Tongues."* Nobody has prepared for the pair, because the pair did not exist until the draw.

At the three-hour mark a **constraint is injected** — your sensor starts lying, your input grows tenfold, a column contradicts your answer. You ship anyway.

Machines finalists may bring their machine built, as at the Regionals. Day One then becomes six hours of *extending* it against the fused theme and the live constraint.

II

Break — Day Two morning, ninety minutes

Each team receives **another team's entry and its Entry Card**, and has ninety minutes to find a failure *the builders did not declare in box 4*.

Points for finding one. Points for having survived one. The team that honestly named its own weakness is much harder to catch — which is exactly the habit this championship has been teaching all year.

There is a **floor**: a team whose entry breaks badly is capped, never eliminated. A finalist's national championship does not end at a quarter past ten on the second morning.

III

Defend — Day Two afternoon

An **eight-minute demonstration** and a **seven-minute viva** to a jury that includes our academic partners — and that has already read your Entry Card and the report written by the team that attacked you.

For **Learning Machines** and **Senior Machines** this is where the title is actually decided. A finalist who cannot explain their own control loop, or their own confusion matrix, does not win — however well the thing works.

Why the middle act exists

Because a national final that only asks "does it work?" rewards polish, and polish can be bought. Asking a finalist to take apart somebody else's work, in front of them, tests something that cannot be coached and cannot be outsourced — and it turns the last day from a science fair into an engineering review.

8

National titles

4 ministries × 2 bands

12

Regional titles per zone

4 ministries × 3 bands

1

National Champion School

Across every ministry and band

PART FOUR · RULES

The Entry Card

Every Round 2 and Round 3 entry carries one. Four boxes, filled in on the platform, submitted with the build. It is how a very wide theme stays fair to judge — every entry answers the same four questions, whatever it turned out to be.

Entry Card		CURIOUS LABS BUILDATHON
1 Who is this for? A named, specific person or group. Not “everyone”. “My grandmother, who cannot hear the doorbell” is an answer. “The public” is not.	2 What does it sense or read? Your inputs. The sensors, the dataset, the file, the question. If it learns from data, say whose data it was and how you asked.	
3 What does it decide or do? The logic, in one sentence. If there is a threshold, state the number — and, for Middle and Senior, why it is that number and not another.	4 What does it get wrong? 10 MARKS The honest failure mode. When does it fail, and who does it fail? Naming a real weakness scores. Claiming there is none does not.	

Why box 4 is worth marks

Because knowing what your own build gets wrong requires having built it. It cannot be answered from the outside, by a parent, a coach or a chatbot — only by someone who watched the thing fail and understood why.

It does more to keep this championship honest than any proctoring we could afford — and it is a better habit to teach than pretending things work.

And at the Nationals, it becomes the weapon

In the **Break** round, another team gets your entry *and your Entry Card*, and tries to find a failure you did **not** declare in box 4.

Which means an honest box 4 is not modesty. It is armour.

PART FOUR · RULES

Scoring & Judging

Rounds 2 and 3 — the rubric, out of 100

The same rubric at every centre, in every zone, published here in advance and never changed mid-competition.

25	25	15	10	15	10
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MARKS	CRITERION	WHAT THE JUDGES ARE ACTUALLY LOOKING FOR
25	Does it work	Demonstrated in front of the judge, not described. A thing that half works and is honestly shown beats a thing that is claimed to work.
25	The surprise task	How you handled a change you could not have prepared for. The anti-coaching weight.
15	Explanation / viva	Can you explain your own work — the threshold, the loop, the metric, the method?
10	Entry Card, box 4	The honest failure mode. Naming a real weakness scores; claiming none does not.
15	Fit to the drawn theme	Including originality inside it — judges see the other entries on your theme at that centre, and an obvious near-duplicate loses marks.
10	Craft	Finish, clarity, care. The smallest weight on purpose.

How judging is run

Two judges per entry, scoring independently and blind to each other.

A gap of more than 15 marks goes automatically to a third judge.

Judges never see your school's name until scores are locked.

Every score is written to the audit log, so a disputed result has an answer rather than an argument.

The school score

A school's standing is the **mean of its top 20 scores** in each ministry — not the total.

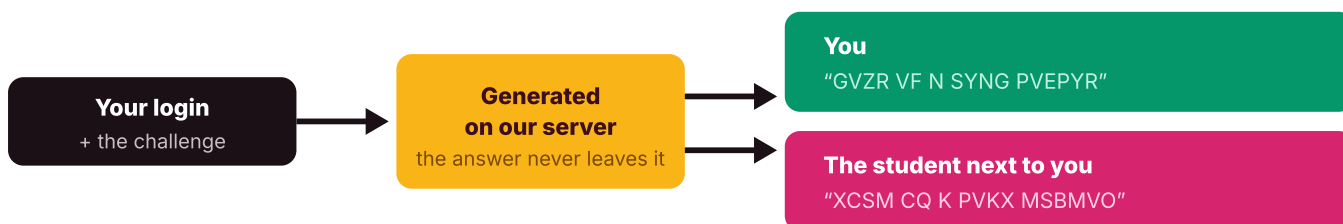
Mean-of-top-20, deliberately: a school entering two thousand students must not be able to out-rank a school entering two hundred simply by having more of them.

PART FOUR · RULES

Fair Play

Round 1 runs unproctored, in thirty-six thousand homes and classrooms. We can still stand behind the result, and this page explains exactly why.

Every challenge is built for you alone



Same puzzle, same method, different letters. A copied answer does not fit your lock. **Sharing a method helps you both — and that is called studying.**

Allowed

Paper, pens, a calculator, your own notes.

Writing your own Python in the Code studio to help you solve a Signals puzzle.

Taking a hint. It is priced, it is published, and it is a legitimate tactic — not a confession.

Talking to your teacher *before* the round about how a method works — and entering every ministry, in a team in more than one.

Not allowed

Another person sitting your attempt, in the room or remotely.

Submitting work built by a parent, a coach or anyone who is not on your team.

Sharing your account, or using someone else's.

Submitting someone else's project as your own — or anything aimed at a live computer, account or network. See below.

Signals & Secrets is a puzzle competition, not a hacking competition

Every cipher, hash and vault in this championship is a self-contained artefact we generated for you. Nothing in this book asks you to touch a real system. **Attempting anything against a live computer, account or network — including ours — ends the student's championship immediately and permanently**, and if a member of staff encouraged it, the school's too.

And the real proctor is the Regionals

A student who cannot reproduce their Round 1 standard in person — on a surprise task nobody saw coming, in front of a judge who will ask how it works — does not advance. We publish this rule up front on purpose. It makes cheating in Round 1 pointless rather than merely risky.

If something goes wrong

Report it through the help desk *while it is happening*. Your attempt state lives on our server, so a crash does not cost you your entry. Appeals must reach the Organising Committee within **seven days** of publication.

PART FOUR · RULES

Awards & Recognition

Most of what a student takes away from this championship is not a trophy. It is a record of what they can do that somebody else can verify.



8

National titles

4 ministries × Middle and Senior



144

Regional titles

12 zones × 4 ministries × 3
bands



All

Round 1 completers

get a certificate, whatever they
scored

The Skill Passport — the part worth keeping

Every certificate carries a **QR code linked to a signed Skill Passport**. Anyone — a school, a university admissions office, a competition, an employer — can scan it and land on a Curious Labs page that confirms the credential is genuine and has not been altered since it was issued.

It is cryptographically signed, which means it cannot be edited, forged or invented. As far as we know it is the only school competition credential in India that anyone can independently verify, and it is the thing we would tell a student to keep.

For schools

A plaque for every regional-winning school.

The **National Champion School** trophy, taken across every ministry and band.

School standings published all through Round 1, so a school can see where it stands while there is still time to rally.

For teachers

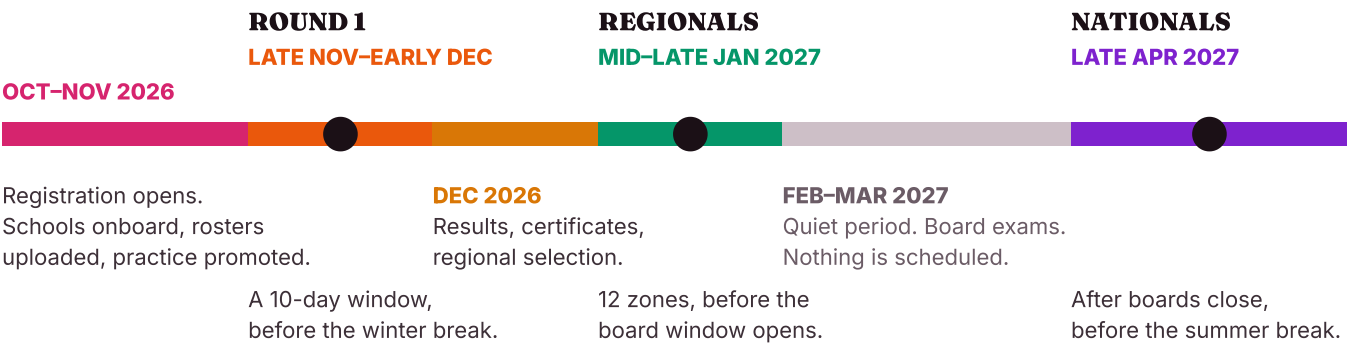
Named recognition for the coordinator of every school that reaches the Regionals.

A **Mentor of the Year** award in each zone, nominated by students — not by results.

PART FIVE · TAKING PART

The Calendar

Built around the board-exam window, not in spite of it. Classes 10 and 12 sit boards from roughly mid-February to mid-April, so the championship deliberately goes quiet across those two months.



Two consequences, stated plainly

Nationals falls after 1 April, so finalists will technically have moved up a grade. Your band is fixed at the grade you were in when your school registered, and it does not change. Nobody is re-banded between rounds.

Class 12 finalists will have just finished their boards. That is the best possible timing for them — but it means the invitation goes out in **December**, not April, so families can plan around it.

Dates your school must diarise

Dry run 1 — four weeks before Round 1 opens.

Dry run 2 — the week before.

Roster deadline — two weeks before Round 1 opens. A student not on the roster by then cannot be added during the window.

Exact dates are published with the registration pack and confirmed by email to your coordinator.

Everything on this page is marked **TBC** until the Organising Committee confirms it. Any change will be published at least 21 days before it takes effect, and your coordinator will be emailed directly.

How Your School Registers

Entry is at school level. One registration covers every student the school enters, in every ministry and every band. The entry fee is ₹100 per student for each challenge they enter, paid when you register.

1

Nominate a coordinator

One teacher who will be our single point of contact. They receive the schedule, the dry-run links, the results and the regional invitations. Everything we send goes to them.

2

Register the school

Name, city, board, approximate student numbers per band, and which ministries you expect to enter. Also — honestly — how many working devices you have and what your internet is like. That last answer decides how we support you, and it is never used to judge you.

3

Upload your roster

One spreadsheet: name, grade, section. The platform generates a login for every student and a class code for every section. Your coordinator can add or correct students right up to the roster deadline.

4

Practise — it is open right now, and it is free

Every studio and the whole practice arena are already live. A student who works through the practice trails will have met every idea Round 1 uses. This is the single most useful thing a school can do between now and the window opening.

5

Complete both dry runs

Twenty minutes each, on the real arena, four weeks and one week before. They exist so that a firewall, a browser or a login problem is found in practice rather than in the middle of a child's attempt.

What your students need

Required

- A computer or tablet with a current browser
- An internet connection — it does not need to be fast
- Their Curious Labs login

Not required

- Any robotics kit, sensor or microcontroller
- Any paid software, licence or cloud account
- Anything installed on the machine

To register, or to ask anything at all

learn.curiouslabs.online/buildathon

Registration, the schedule, the practice arena and the current version of this rule book all live there.

Questions We Are Asked

We have no robotics lab. Can we enter Machines?

Yes, completely. All six Machines themes are built in the browser, with sixteen simulated sensors, motors, servos and relays. You are on exactly the same footing as a school with a lab. If you *do* own kit, you may put your build on real hardware at the Regionals — it earns no extra marks.

Can one student enter all four ministries?

Yes. Each has its own 120 minutes in Round 1 and its own score, and a student can reach the Regionals in more than one. A group of three can also enter as a team in both team ministries and still compete individually in the other two.

Our internet is unreliable. What happens?

Your attempt state lives on our server, not in your browser. If the connection drops, log back in and carry on inside the same window. Round 1 is a ten-day window rather than a fixed sitting for exactly this reason. Tell us about your connection at registration and we will plan around it with you.

What does it cost?

Practice is free, for every student. Entering costs ₹100 per student for each challenge they enter, paid when the school registers — so a team of three entering two challenges is ₹600. Costs for attending the Regionals and Nationals are published with the registration pack.

My child changes grade in April. Which band?

The one they were in when the school registered. Band is fixed at registration and never changes between rounds — including across the April session change, which falls between the Regionals and the Nationals.

How do you stop students sharing answers?

Every Round 1 challenge is generated from the student's own login, so two students at the same desk hold different numbers and different ciphertext. A copied answer does not fit your lock. Sharing a *method* does work — and that is studying, which we are in favour of. See page 25.

Can a parent or coach help build the entry?

No. They can teach, before the round. They cannot build. The surprise task, the viva and box 4 of the Entry Card are all designed to find out — and they reliably do. An entry a student cannot explain does not score, whoever made it.

Do Grades 3–5 really not go to Nationals?

Correct. The Junior championship is decided at the Regionals, where every zone crowns Junior champions in all four ministries — same stage, same trophies, same ceremony.

Something is still unclear.

Ask through the help desk inside the platform, or write to your coordinator, who has a direct line to the Organising Committee. If your question is a good one, it will end up on this page in the next edition.

IN ASSOCIATION WITH

Our Partners

A national championship of this size is not run by one organisation. These are the people who make it possible — and what each of them brings.

Academic Partners

JURIES · CHALLENGE DESIGN · CAMPUSES

IIT Bombay

IIT Delhi

FURTHER
ACADEMIC PARTNERS

Academic partners sit on the national jury, help set the Senior challenge material, and host regional rounds on campus. They see aggregate results and the finalists who opt in — never a student roster.

Technology Partners

INFRASTRUCTURE · MENTORS · CHALLENGES

Google

Amazon

FURTHER
TECHNOLOGY PARTNERS

Technology partners provide the infrastructure the online round runs on, send engineers to mentor at the Regionals and Nationals, and may sponsor a named challenge inside the arena.

Sponsors

Hummingbird

Yudu Robotics

Sponsors underwrite the regional rounds, the trophies and the prize pool, and bring hardware for the optional physical builds.

Media Partners

NDTV

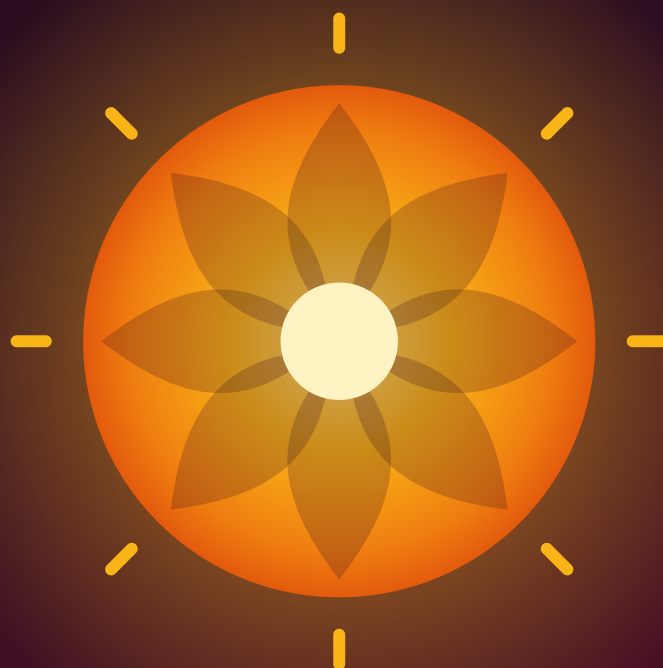
FURTHER
MEDIA PARTNERS

Media partners carry the national final and tell the stories of the schools and students who got there.

Indicative placement only

The organisations named on this page and on the cover are shown to illustrate how each partner tier will be presented. **Partnerships are under discussion and none is yet confirmed.** This page will be reissued as each one is signed, and no organisation appears as a confirmed partner until it has agreed in writing.

*“Look hard at one real thing that does not
work well enough — and build something that
makes it work better.”*



Curious Labs Buildathon

Mission Bharat 2047 — build the India you'll live in.

learn.curiouslabs.online/buildathon