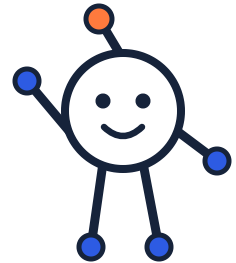


PILOT INVITATION · GRADE 2 · 2026-2027 SCHOOL YEAR

Discrete Math Adventures

A full year of weekly mathematics enrichment for one Grade 2 classroom. No cost, no devices, no prep.



Second grade mathematics is almost entirely about quantity. **Discrete mathematics is about structure** — how things connect, how many arrangements exist, whether something is possible at all. It asks for real reasoning while asking almost nothing of computational fluency, so it reaches the students arithmetic practice leaves behind and still stretches the ones who finish early. We have built a 36-week program for Grade 2 and are placing it in classrooms across the San Gabriel Valley. We are looking for teachers, not buyers.

36	30-40	20	\$0
weekly assignments one school year	minutes a week two pages, front and back	CA standards touched reinforced, not replaced	to the school materials included

WHAT MAKES IT DIFFERENT

It is sequenced to your pacing guide. Money week lands on coin counting. Time week lands on clock arithmetic. The array weeks sit at the end of the year where multiplication begins. The sheet reinforces what was taught on Tuesday.

Three weeks end in a proof of impossibility. Two colors cannot work. Five dots cannot each have three lines. The bridge walk cannot be done. Explaining *why* is a kind of thinking the regular curriculum rarely asks for at this age — and second graders can do it.

THE ASK

One Grade 2 teacher, one class, one school year, about 35 minutes a week. In return we provide every material, answer every question within a school day, and ask the teacher for a short log and one exit conversation in June. That is the whole commitment.

WHAT IT IS NOT

- Not a replacement for your math curriculum.
- Not a pull-out program for identified students.
- Not a technology program — no devices, no logins, no subscription.
- Not a proven intervention — it is new, and this pilot is how it gets tested. We would rather say that than imply otherwise.

What a pilot involves

We have deliberately made this small. A pilot that requires a planning committee will not happen, and a program that cannot survive one busy teacher trying it is not ready anyway.

BEFORE AUGUST

Say yes

A 20-minute call with the teacher and, if you like, the principal. We answer questions and confirm the class.

AUGUST

Materials arrive

Printed workbooks for the class, the teacher guide, and a 45-minute orientation — in person or by video, whichever is easier.

SEPT-MAY

One page a week

The teacher runs the weekly assignment. We check in monthly by email and are reachable same-day for anything urgent.

JUNE

What we learned

A 30-minute exit conversation, and we share the full results with the school before anyone else sees them.

WE PROVIDE

- Printed student workbooks for every child in the class
- The teacher guide — every answer, every week, plus running notes
- The orientation session and a named person to email
- Replacement copies at any point in the year
- All measurement instruments and the consent materials

THE SCHOOL PROVIDES

- One Grade 2 classroom and a willing teacher
- About 35 minutes of instructional time a week
- Crayons, counters, and number cards — almost certainly already in the room
- Permission for a brief pre and post activity with students
- Access to the benchmark data the district already collects

WHAT WE ARE TRYING TO LEARN

The question we care most about is not whether test scores move. It is **whether a different kind of content changes who gets to be the child explaining something to the class**. The teacher log — a one-minute note on who volunteered an explanation each week — is the measure that answers it.

We also watch grade-level benchmark performance, because the honest risk of any supplement is opportunity cost. If benchmark performance declines relative to comparison classrooms, that is a real finding and we will report it.

IF IT IS NOT WORKING

Stop. There is no contract, no invoice, and no obligation to finish the year. A teacher who tells us in November that this is not working for their class is giving us more useful information than one who quietly completes it. We would ask only for a short conversation about why.

Who runs this

Young Innovators for Change is a K-12 education nonprofit based in the San Gabriel Valley. The Discrete Math Adventures program and its accompanying working paper, *Structure Before Fluency*, were developed in-house and are provided to partner schools at no cost. Full materials, the teacher guide, and the research argument are available at innovateyouth.org.

Standards crosswalk

Every week, the standards it reinforces, and what the class is typically doing that week. This is enrichment — it extends these standards rather than delivering them, and no standard here is taught to mastery by this program alone.

WK	ASSIGNMENT	STANDARDS	IN CLASS THAT WEEK
1	What's My Rule?	2.OA.3 · 2.G.1 · MP7	Adding & subtracting within 20
2	Two Circles, One Middle	2.OA.3 · 2.G.1 · 2.MD.10	Sorting; even and odd
3	Pair Them Up	2.OA.3	Odd and even numbers (2.OA.3)
4	Always, Sometimes, Never	2.OA.3 · 2.G.1 · MP3	Fluency within 20
5	How Computers Count	2.NBT.1 · 2.NBT.3	Place value to 1000 (2.NBT.1)
6	Number Machines	2.NBT.2 · 2.OA.2 · MP7	Skip counting by 5s, 10s, 100s (2.NBT.2)
7	Put Them in Order	2.NBT.4 · MP8	Comparing numbers (2.NBT.4)
8	Twenty Questions	2.NBT.4 · MP7 · MP8	Greater than / less than (2.NBT.4)
9	The Shortest Way to the Gold	2.NBT.5 · 2.OA.1	Adding within 100 (2.NBT.5)
10	Magic Squares	2.OA.1 · 2.NBT.5 · MP7	Missing addends (2.OA.1)
11	Balance Puzzles	2.OA.1 · 2.OA.2	Equations and unknowns (2.OA.1)
12	The Handshake Problem	2.OA.1 · 2.NBT.5 · MP8	Adding within 100 (2.NBT.5)
13	Detective Week	MP1 · MP3	Review & reasoning
14	Sorting by Length	2.MD.1 · 2.MD.4 · 2.NBT.5	Measuring length (2.MD.1, 2.MD.4)
15	Covering a Strip	2.MD.1 · 2.OA.4 · MP8	Length as repeated units (2.MD.1)
16	Two Ways Across the Park	2.MD.5 · 2.MD.6 · 2.NBT.5	Adding lengths; number line (2.MD.5, 2.MD.6)
17	Color the Kingdom	2.G.1 · MP1	Shapes and attributes (2.G.1)
18	When Three Colors Is Not Enough	2.G.1 · MP3	Attributes; impossibility (2.G.1)
19	How Many Ways to Make 15¢?	2.MD.8 · MP7	Money (2.MD.8)
20	The Fewest Coins	2.MD.8 · 2.NBT.5 · MP3	Money word problems (2.MD.8)
21	Clock Arithmetic	2.MD.7 · 2.NBT.2 · MP2	Telling time to 5 minutes (2.MD.7)
22	Getting Ready for the Party	2.MD.7 · MP1	Time and duration (2.MD.7)
23	Dots and Lines	2.MD.10 · 2.OA.2	Bar graphs (2.MD.10)
24	Who Wins the Tournament?	2.MD.10 · 2.NBT.5 · MP8	Reading data (2.MD.10)
25	Puzzle Fair	MP1 · MP3	Review & reasoning
26	Trace It Without Lifting	2.OA.3 · MP8	Odd and even as a tool (2.OA.3)

27	The Bridges of the Old City	2.OA.3 · 2.NBT.7 · MP3	Adding within 1000 (2.NBT.7)
28	Connecting the Towns	2.NBT.7 · 2.NBT.5 · MP1	Adding within 1000 (2.NBT.7)
29	Counting Routes	2.NBT.7 · 2.OA.4 · MP7	Addition patterns (2.NBT.7)
30	Guess My Shape	2.G.1 · MP7	Shape attributes (2.G.1)
31	Cutting Fair Shares	2.G.3 · MP3	Halves, thirds, fourths (2.G.3)
32	Filling a Rectangle	2.G.2 · 2.OA.4	Rows and columns (2.G.2)
33	The Ice Cream Shop	2.OA.4	Arrays and repeated addition (2.OA.4)
34	Choice Trees	2.OA.4 · MP7	Arrays and repeated addition (2.OA.4)
35	Program the Robot	2.OA.4 · 2.G.2 · 2.OA.1	Rows, columns, repeated addition (2.OA.4)
36	Secret Codes	2.NBT.1 · MP2	Place value review (2.NBT.1)

Cost, and where it goes

The pilot is free to the school. The figures below are our internal per-classroom cost, so that a principal can see there is no catch and a funder can see what a seat actually costs.

ITEM	PER CLASSROOM OF 24	NOTE
Student workbooks — 77 pages, B&W, bound	\$96	\$4.00 each at local print rates
Teacher guide — printed and bound	\$9	One copy; also free online
Classroom kit	\$0	Crayons, counters, number cards — already in the room
Orientation and year-long support	\$0	Volunteer-delivered
Digital materials	\$0	Openly available; schools may print their own
Total per classroom	\$105	about \$4.40 per student for the year

IF YOU WOULD RATHER PRINT IT YOURSELF

The workbook is designed for a school copier: single-sided or duplex, black and white, no colour required. Structure lives in the linework and colour is accent only — the entire book was proofed in grayscale before release. A school with its own reprographics can run the program for the cost of paper.

Questions principals ask

Does this take time from tested standards?

It adds about 35 minutes a week and reinforces 20 Grade 2 standards while doing it. We do not claim it raises benchmark scores. We do measure whether it lowers them.

Does the teacher need training in this maths?

No. The guide carries every answer, the common misconceptions, and what to say when a student is stuck. The 45-minute

What about students below grade level?

This is the population the program is most interested in. The reasoning does not require fluency, so a student still working on regrouping can participate fully and be seen to reason well.

What data leaves the school?

No individually identifiable student data. We collect classroom-level counts, the teacher log, and aggregate benchmark results. Consent

orientation is about how to run a week, not about graph theory.

materials are provided and the school approves them first.

INTERESTED?

Return this page, or simply email us. There is nothing to sign.

School

Grade 2 teacher

Best email

Best time to call

Young Innovators for Change · innovateyouth.org · San Gabriel Valley, California

What a week actually looks like

The two pages that follow are **Week 26**, reproduced exactly as a student receives it. We have chosen it deliberately: it is the week where a second grader derives a real theorem from data they generate themselves, and then uses it to establish that a famous problem has no solution.

WHAT IS HAPPENING MATHEMATICALLY

Students count how many lines meet at each dot in six figures, mark the odd ones, and are asked to *predict* before tracing. The prediction is the mathematics; the tracing only checks it. By the bottom of page two they have stated the rule themselves: a figure can be traced in one stroke when it has exactly zero or two odd dots.

The Challenge Zone then hands them Königsberg — four landmasses, seven bridges, every landmass odd — and asks whether the walk is possible. Euler settled this in 1736 and it founded graph theory. A seven-year-old with the rule they just derived can settle it in about ninety seconds.

NOTE THE TOOL ARRIVES 23 WEEKS EARLY

Odd and even are developed in **Week 3**, by pairing counters rather than by memorizing final digits — which is exactly what standard 2.OA.3 asks for. That work is not revisited as review. It is put to use here, six months later, as the instrument that cracks the problem. Students who understood pairing in September have an advantage in March, and they notice.

Trace It Without Lifting

An old puzzle with a beautiful rule hiding inside.

IN CLASS THIS WEEK

Odd and even numbers, used as a tool (2.OA.3)

NUMBER WARM-UP • 2 MINUTES

Circle the odd ones: 1 2 3 4 5 6 7 8. How did you decide?

The challenge: trace each figure with one pencil stroke. You may not lift your pencil, and you may not go over the same line twice. (Crossing at a dot is fine.)

Before you try: count the lines meeting at each dot and write the number right there. Then circle every dot with an **odd** number.

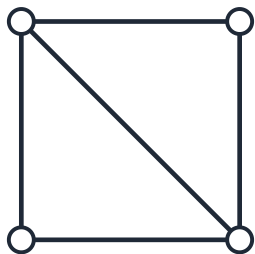


Figure A

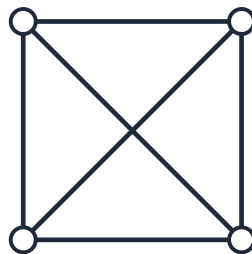


Figure B

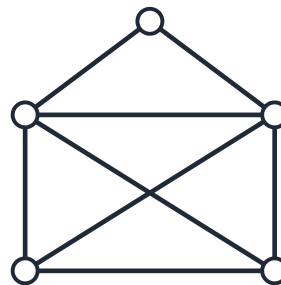


Figure C

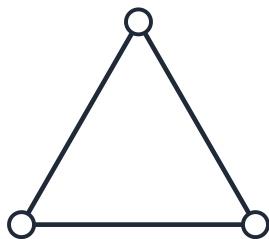


Figure D

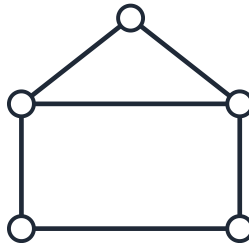


Figure E

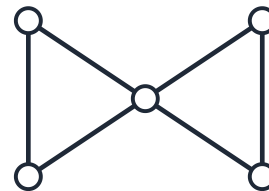


Figure F

Figure						
How many odd dots?						
Can you trace it?						

The rule you just discovered

A figure can be traced when it has _____ or _____ odd dots. Any other number and it is impossible.

When there are exactly 2 odd dots, where do you have to **start**?

Why the rule works

Every time you pass **through** a dot you use up two lines — one to come in, one to go out. So a dot in the middle of your journey always uses lines in pairs. Which means an odd dot can only be the _____ or the _____ of your trip.

Test the rule on a new figure. Draw a shape, count its odd dots, predict, then try.

**TALK ABOUT IT**

Why can a figure never have exactly **one** odd dot? Try to draw one and see what happens.

Figure D has zero odd dots. What is special about where you finish?

**STUCK? TRY THIS**

Write the number right next to each dot before you try tracing anything. The counting is the actual mathematics; the tracing just checks it.

★ CHALLENGE ZONE

In an old city there were 4 pieces of land joined by 7 bridges, and every piece of land had an **odd** number of bridges. People wanted a walk crossing every bridge exactly once. Use your rule: possible or impossible?

Take Figure B, the one that fails. **Erase one line** so that it becomes traceable. Which line, and what happened to the odd dots?