From Engagement to Understanding: Using Games, Sports, and Digital Tools to Deepen Mathematical Thinking

Questions, Games and Exploration that Help Students

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and
Austin Davis

NRSC and DeafTEC
Math and Science Conference 2026
NTID/ RIT
ROCHESTER, NY





MEET YOUR PRESENTER

Aditya Sharma

20+ years making math irresistible.

Role

Middle & Secondary Math

School

Idaho School for the Deaf & Blind

Also

Personal Finance and Driver Ed Teacher.



Meet Austin Davis

Role

ASL Teacher & Presenter

School

Idaho School for the Deaf & Blind

Also

Academic Bowl Coach, Newscast Teacher, Video Editor, Teacher, and Yearbook Advisor

Tech + games = engaged learners.

Is Math the most hated subject?

70 Percent of people accepting a credit card offer do not read the fine print about interest rates/ APR etc

the **United States, 22% of 12th-grade students scored at or above “Proficient” in mathematics** on the latest national assessment, the **2024 NAEP**—about 1 in 5. Source: Nation’s Report Card

22%

"The laws of nature are written by the hand of God in the language of mathematics."

Spoken by one of history's greatest minds

Galileo Galilei

1564 – 1642

> *"The laws of nature are written by the hand of God in the language of mathematics."*



Core Fraction Standards (3.NF)

- **3.NF.A.1 –**
  - Understand a unit fraction $\frac{1}{b}$ as the quantity formed by 1 part when a whole is partitioned into b equal parts. Understand a fraction a/b as the quantity formed by a parts of size $\frac{1}{b}$

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Introducing Math as a Language



Why Games?

Games **are** the learning.

3x

Engagement

Longer on-task

40%

Less Anxiety

Reduces fear of failure

5min

Prep Time

Just a card deck

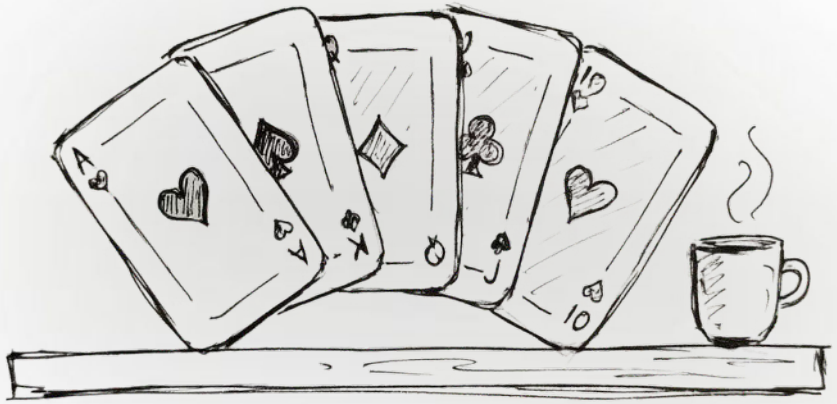


The Core Belief

Play = deeper math retention

Math is the reward.

Use it tomorrow morning.



CHAPTER 1

Hands-On Games

Low-tech. High-impact.



Multiplication War

1

Flip Two Cards

Each pair flips two

2

Multiply!

Highest product wins all

3

5 Rounds

⏱️ 5 min · Gr. 3–9

4

Level Up!

Use 3 cards for advanced



🏃 Active Math Moves

Movement + math = better memory

🚶 Hopscotch

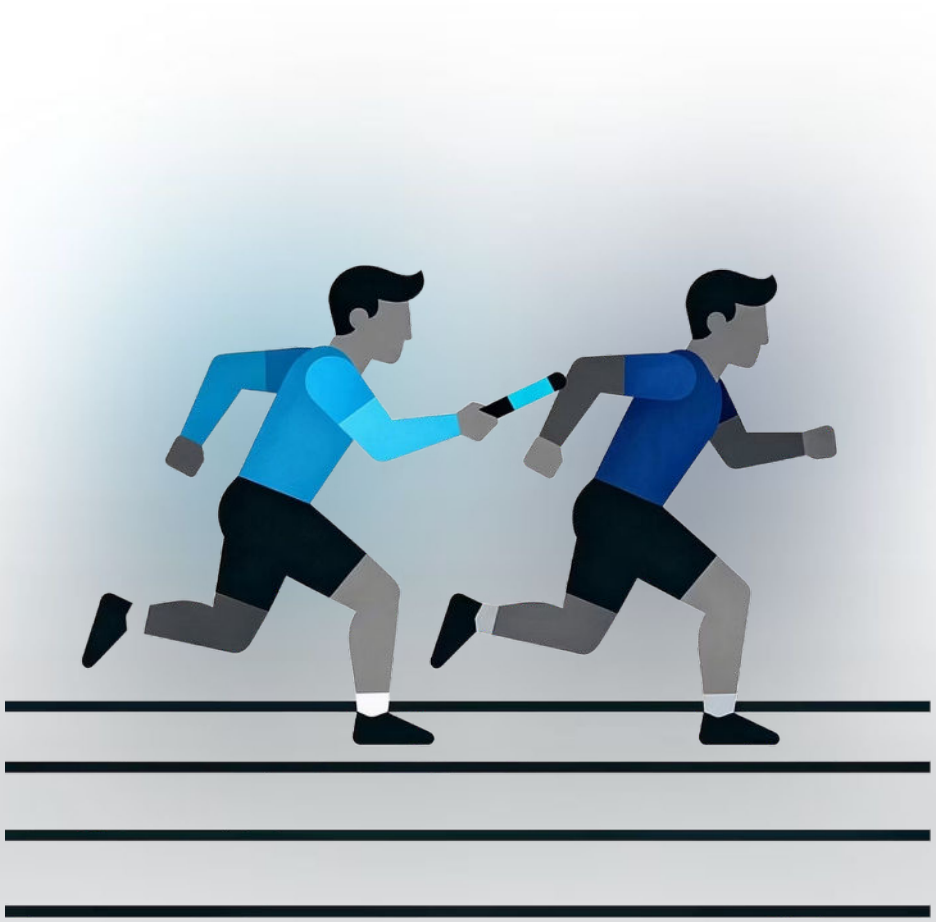
Call answer before landing

📏 Number Line Walk

Walk forward & backward

👥 Human Arrays

Form arrays with bodies



🏅 Math Relay Races

Teams of 4 — one operation each!

1. **Divide**
   Split into teams
2. **Solve & Pass**
   Answer = next input
3. **Verify**
   Wrong? Team backtracks
4. **Celebrate**
   First correct team wins!

CHAPTER 2

Digital Games & Live Play

Math practice that feels like fun.



🕹️ LIVE PLAY BREAK #1

Race on Arcademics!

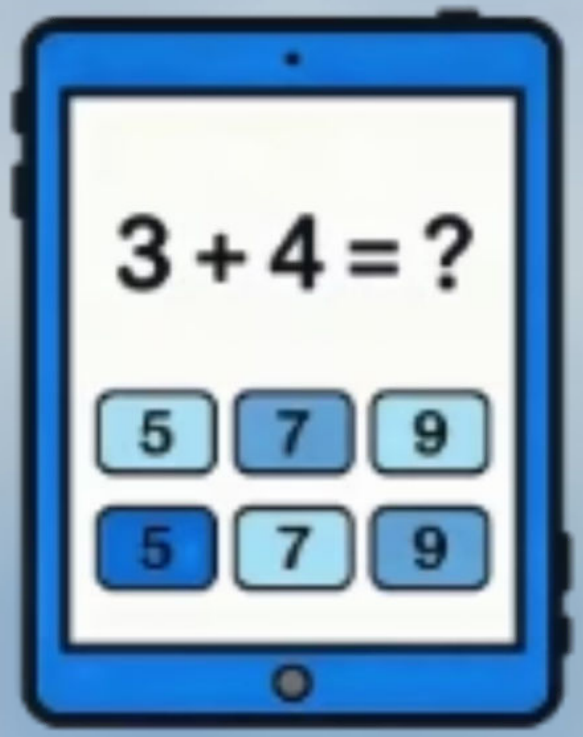
1. **Open Your Device**
   Phone, tablet, or laptop

2. **Go to arcademics.com**
   No account needed

3. **Choose Grand Prix**
   Multiplication or Division

4. **Race & Reflect**
   Feel what students feel





Arcademics.com

Multiplayer math racing — real fluency.

Race Live

Math battles worldwide

No Login

Play instantly

Class Mode

Private class rooms

Free

Core games free

🎮 Platforms That Make Math Fun

Free tools for every grade.



Arcademics

Multiplayer racing, K–8



Prodigy Math

RPG battles, grades 1–8



Gimkit

Earn currency, answer correctly



Kahoot! & Blooket

Live quizzes, leaderboards

CHAPTER 3

Science, Strategy & Differentiation

Great game-based learning is **intentional**.



Research Behind Game Learning

Active play drives retention, understanding, and motivation.

🧠 Dopamine & Memory

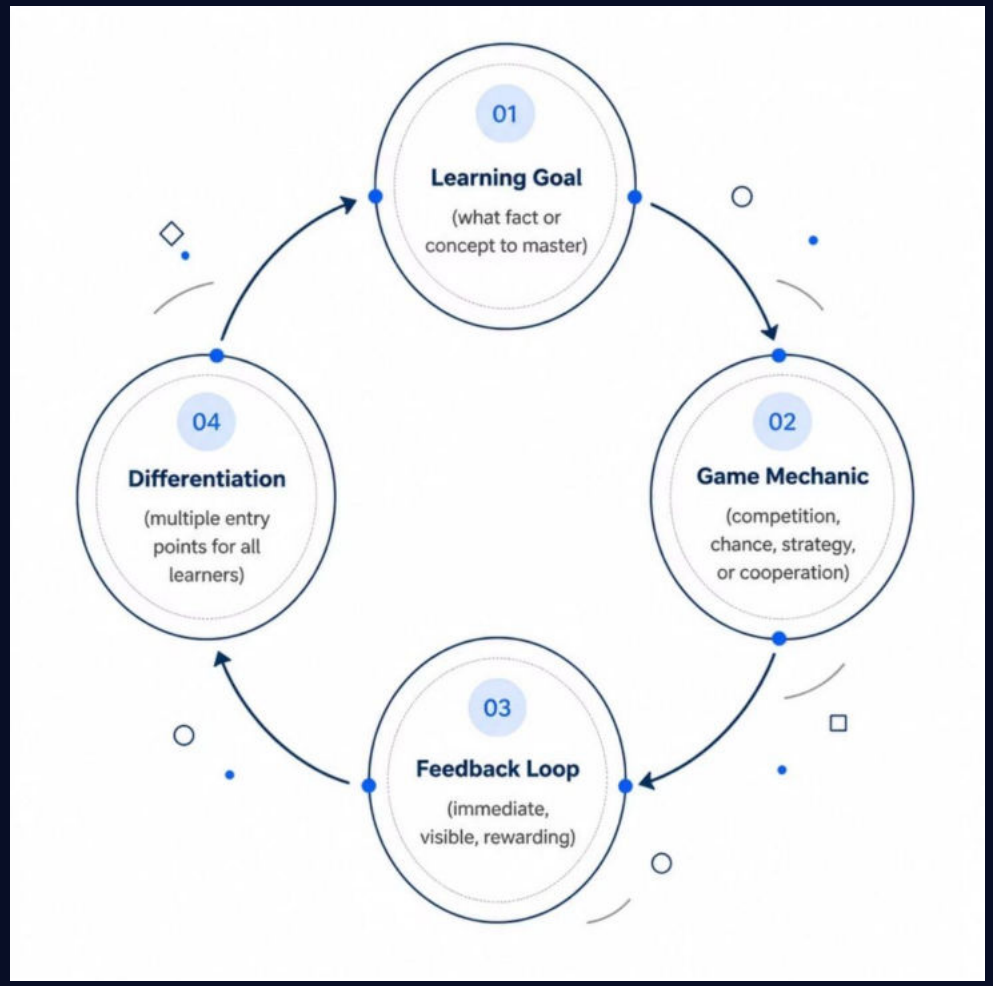
Strengthens memory and resilience.

🎯 Immediate Feedback

Students self-correct in real time.

🔁 Deliberate Practice

Students repeat to improve.

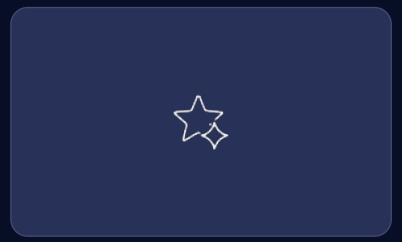


🎯 Design Games That Teach

Every game answers 4 questions.

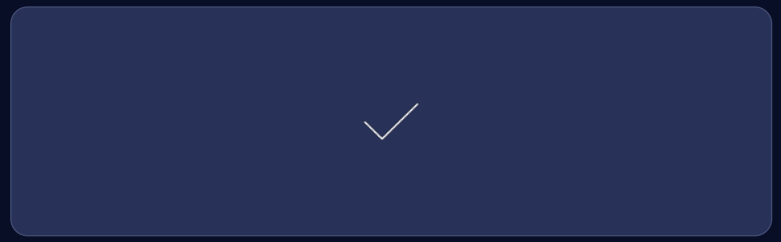
1. Skill practiced?
2. Mechanic reinforces how?
3. Students know they're right?
4. All students access it?

🏗️ Differentiate with One Game



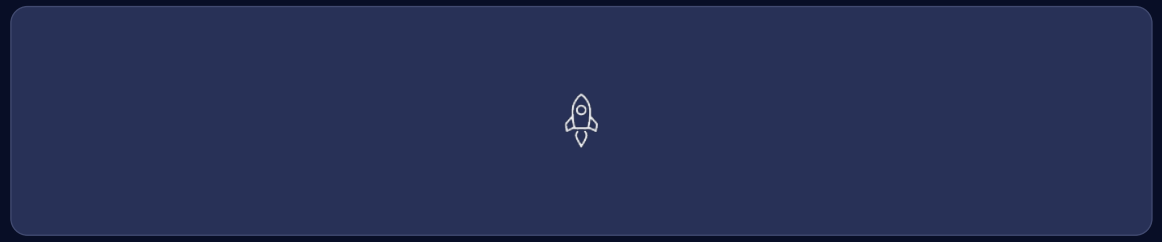
🟢 Tier 1 — Foundational

Visual aids, smaller numbers



🔵 Tier 2 — Grade Level

Standard rules, current unit



🟣 Tier 3 — Extension

Advanced constraints, student variations

🗂️ Classroom Management



📋 Set Rules First

Post 3 non-negotiables



🔔 Use a Signal

One cue resets room



🌟 Reward Effort

Praise strategy, not winners



💬 Debrief Every Game

3 minutes cements learning

🤔 Stump the Teacher

Students become the experts.

1 Create a Question

Write your hardest math question.

2 Challenge Live

Put facilitator on the spot.

3 Model Struggle

Think aloud. Normalize difficulty.

🚀 LIVE PLAY BREAK #3

Kahoot! Live Demo

1. 📱 Open kahoot.it
2. 🔑 Enter the PIN
3. 🎮 Play as student
4. 🏆 Winners share strategies

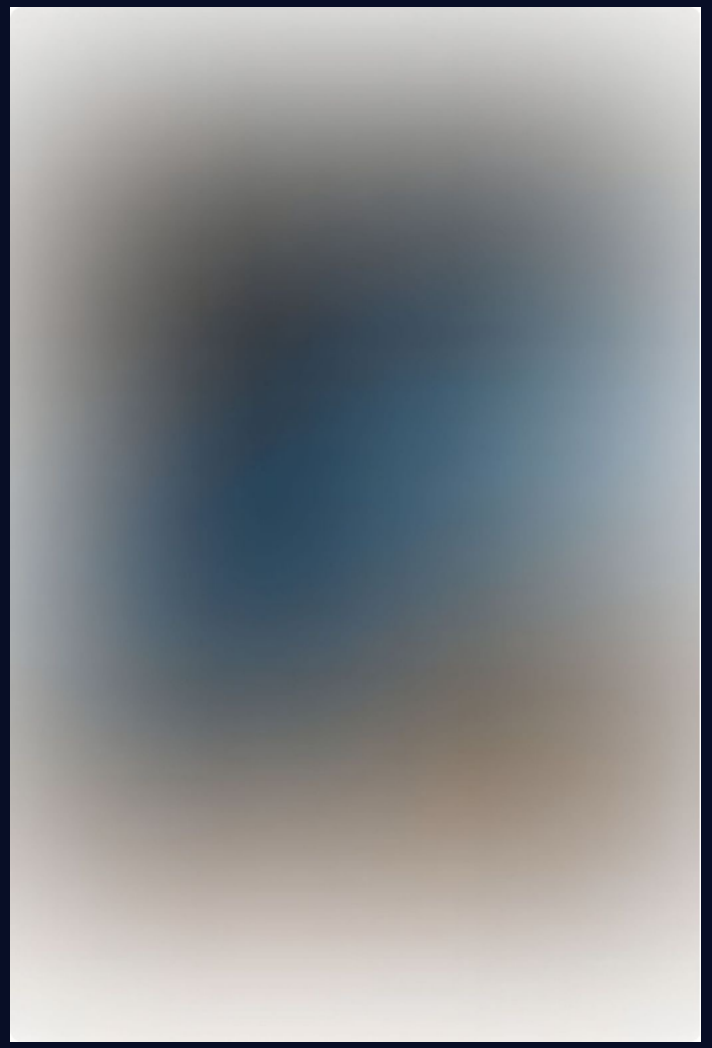
🤔 **That feeling? Your students feel it too.**



CHAPTER 4

🚀 30-Day Game Challenge

Week-by-week roadmap.



🧰 Build Your Game Chest

One game a week — big results.

1

📅 Week 1–2: Cards & Dice

24 Challenge, War, Yahtzee

2

💻 Week 3–4: Digital Games

Kahoot!, Prodigy, Arcademics

3

🏃 Week 5+: Physical & Puzzles

Hopscotch math, relay races

4

🎨 Week 8+: Student-Designed

Co-design deep math thinking

Key Takeaways

1. Games are the instruction
2. Tier any game fast
3. Movement builds memory
4. Start tomorrow

Use Games as way to encourage mathematical thinking

5 principles to encourage mathematical thinking

Dan Finkel

René Descartes' famous philosophical statement, “I think, therefore I am,”

Descartes looked deeper into the nature of thinking. Once he established himself as a thing that thinks, he continued, *“What is a thinking thing?”*

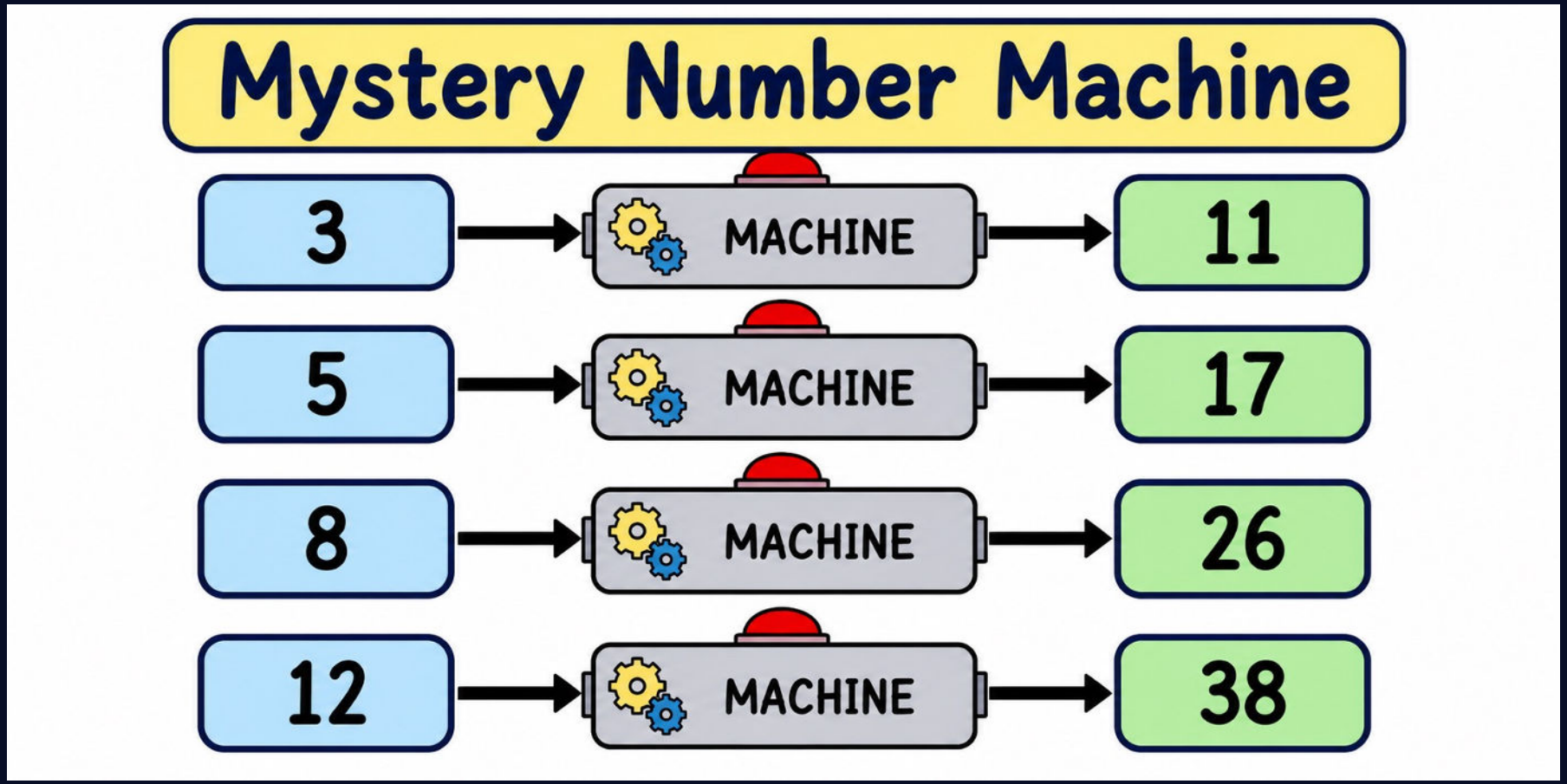
> It is the thing that doubts, understands, conceives, that affirms and denies, wills and refuses, that imagines also, and perceives.



1. Start with a question

- **Start with a question:**

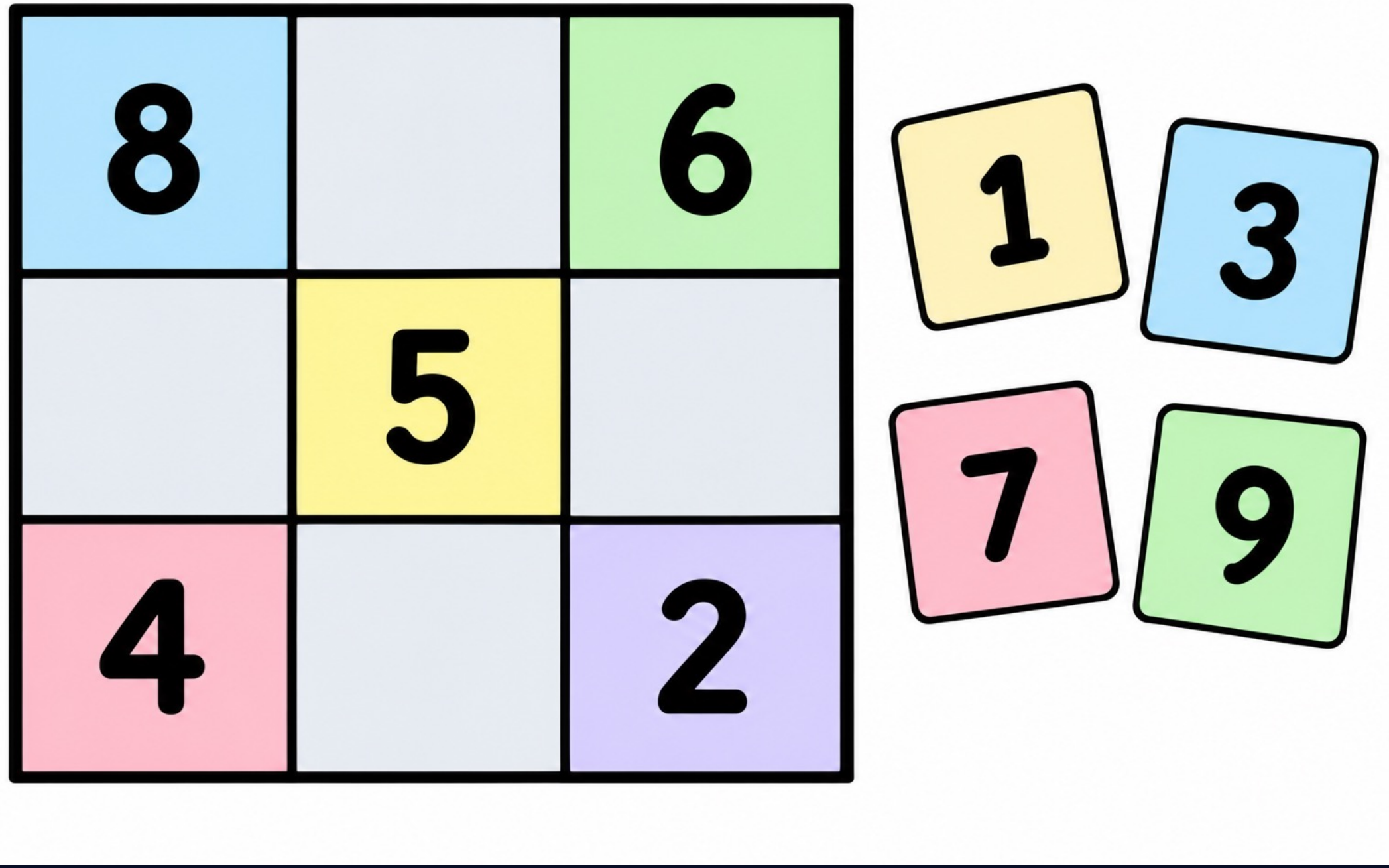
Mystery Number Machine

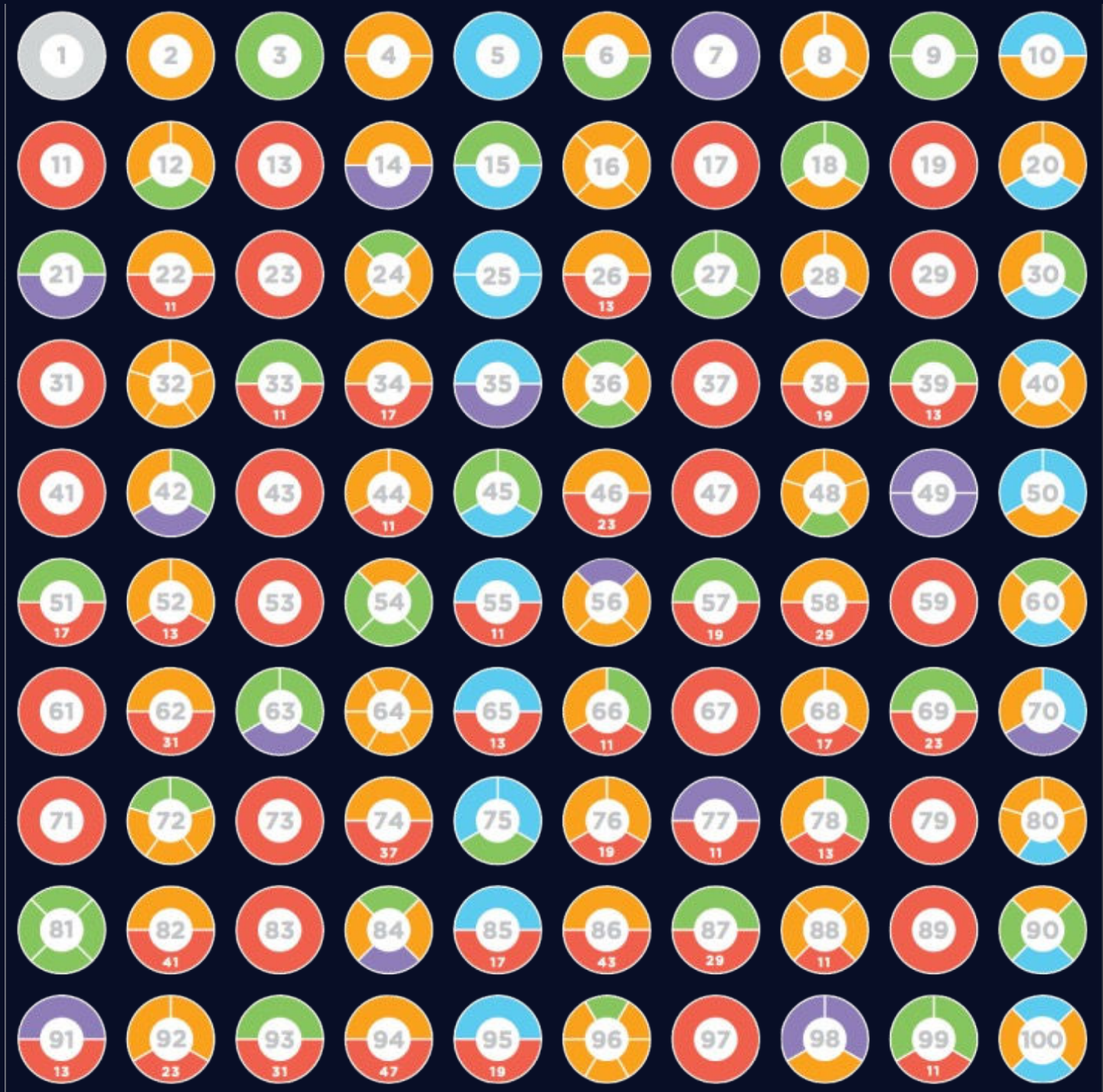


- What is the machine doing?
- What would 20 become?

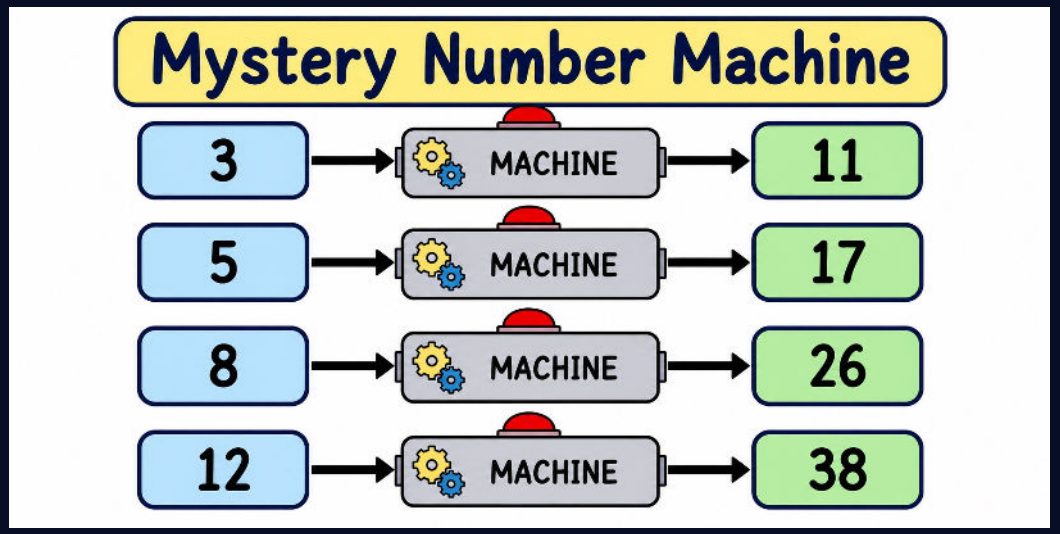
The Impossible Square

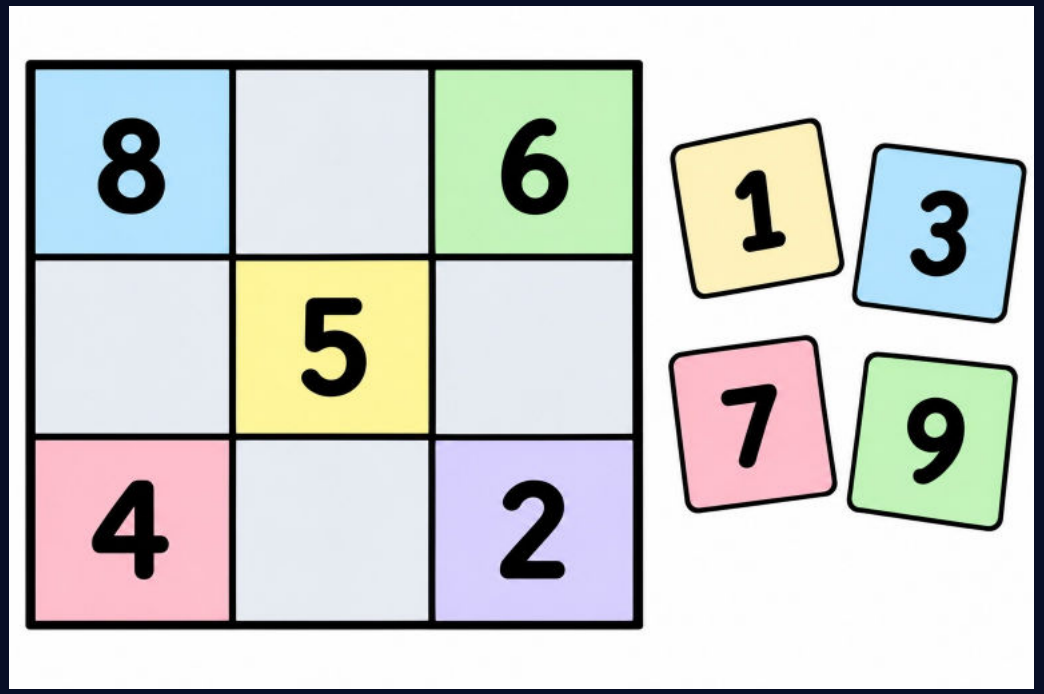
8	1	6
3	5	7
4	9	2

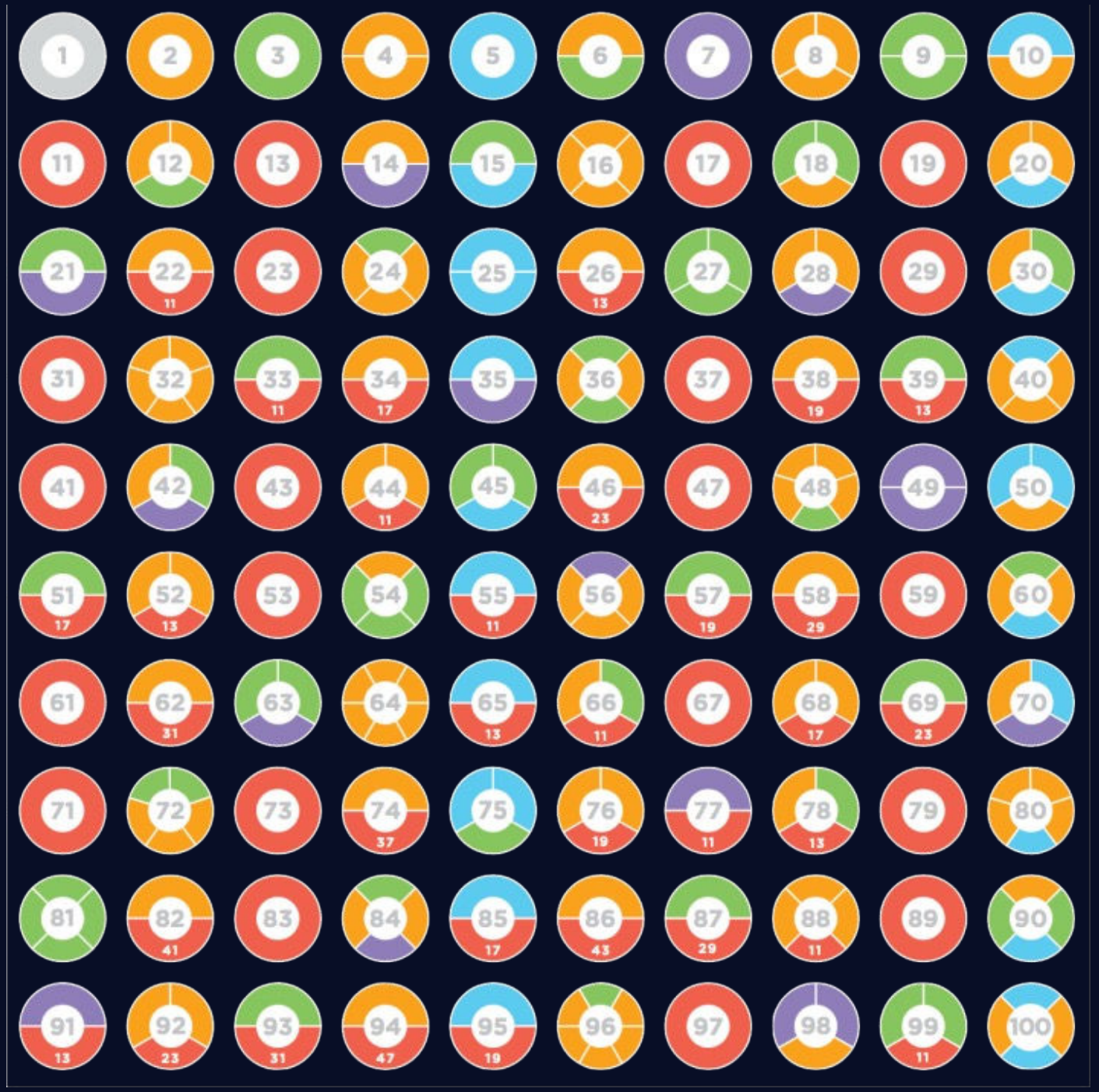

8
6
5
4
2
1
3
7
9


1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 11 23 24 25 26 13 27 28 29 30
31 32 33 11 34 17 35 36 37 38 19 39 13 40
41 42 43 44 11 45 46 23 47 48 49 50
51 17 52 13 53 54 55 11 56 57 19 58 29 59 60
61 62 31 63 64 65 13 66 11 67 68 17 69 23 70
71 72 73 74 37 75 76 19 77 11 78 13 79 80
81 82 41 83 84 85 17 86 43 87 29 88 11 89 90
91 13 92 23 93 31 94 47 95 19 96 97 98 99 11 100

2. Students Need Time To Struggle


Mystery Number Machine
3
MACHINE
11
5
MACHINE
17
8
MACHINE
26
12
MACHINE
38


8
6
5
4
2
1
3
7
9


1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 11 23 24 25 26 13 27 28 29 30
31 32 33 11 34 17 35 36 37 38 19 39 13 40
41 42 43 44 11 45 46 23 47 48 49 50
51 17 52 13 53 54 55 11 56 57 19 58 29 59 60
61 62 31 63 64 65 13 66 11 67 68 17 69 23 70
71 72 73 74 37 75 76 19 77 11 78 13 79 80
81 82 41 83 84 85 17 86 43 87 29 88 11 89 90
91 13 92 23 93 31 94 47 95 19 96 97 98 99 11 100

3. YOU ARE NOT THEANSWER KEY.

4. Say Yes to Their Answers

From 0 to 8 on a number line

Moves: 0 | Position: 0

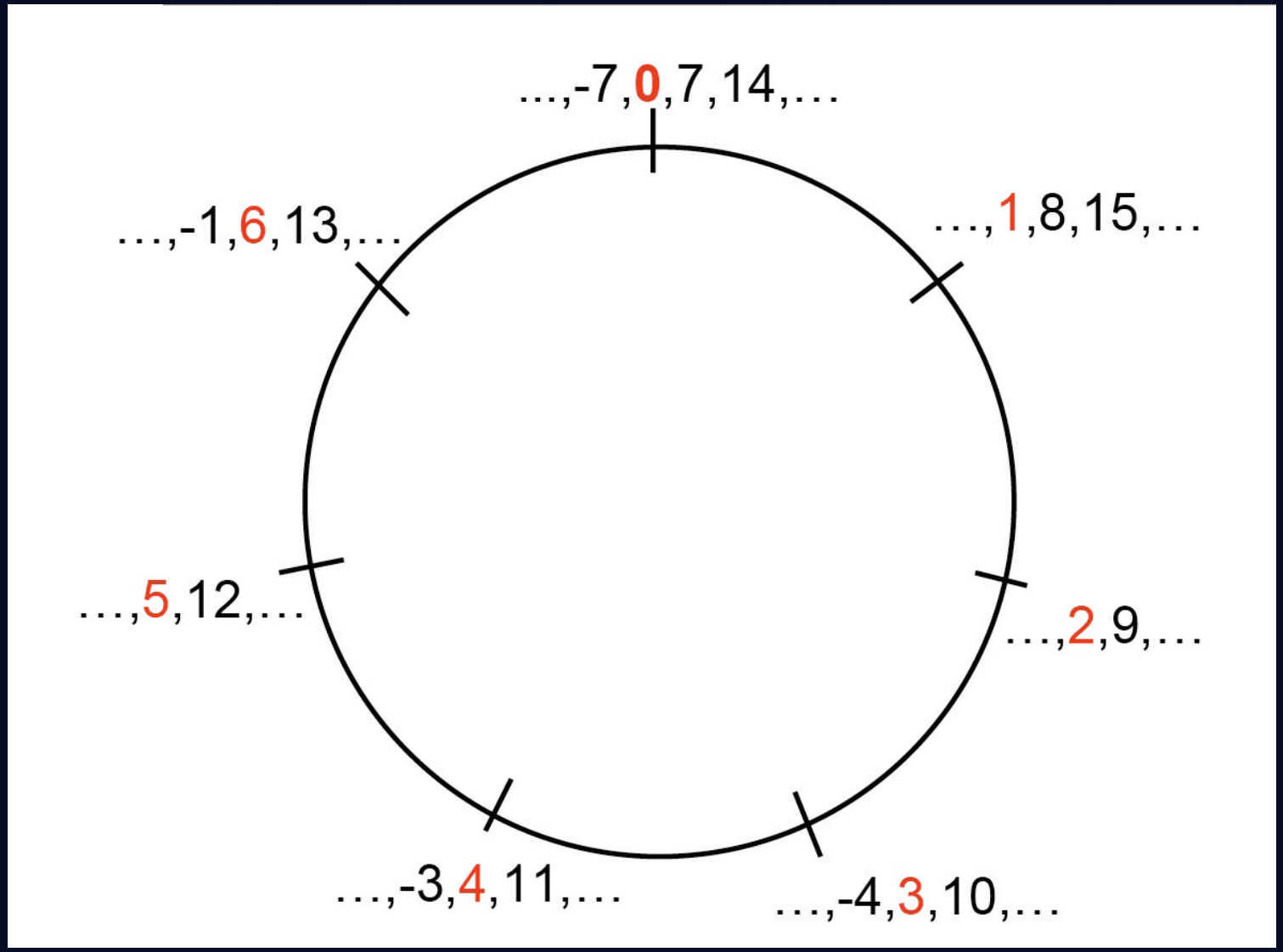


Start at 0. Move one step at a time.

A number line becomes a circle

Number line: start at 0




…,-7,0,7,14,…
…,1,8,15,…
…,2,9,…
…,-4,3,10,…
…,-3,4,11,…
…,5,12,…
…,-1,6,13,…

ALL IT TAKES IS WILLINGNESS TO PLAY.
And that is principle five.

Mathematics is not about following rules. It's about playing and exploring and fighting and looking for clues and sometimes breaking things.

Einstein called play the highest form of research.
And a math teacher who lets their students play with math gives them the gift of ownership.

12th-grade students who scored at or above “Proficient” in mathematics

22%

Thank You!

Let's keep the conversation going! 🎲

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Austin Davis

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📚 References & Resources

Research

> **Wiggins & McTighe** — *Understanding by Design*

> **Hattie** — *Visible Learning: The Sequel*

> **CDC** — Physical Activity & Achievement

> TED TALK: Five Principlas of Extraordinary Math Teaching

Game-Based Tools

- Arcademics
- Kahoot!
- Prodigy
- Desmos Teacher