

Make Learning Math Facts Fun: Alternatives to 'Drill & Kill'

by
Nancy Blachman, MathDelights.org
&
Maya Sissoko, Nueva School

Flashcards, worksheets, and other repetitious material are likely to turn children off from mathematics. Instead, stimulate interest and curiosity with dice and card games, magic tricks, and number puzzles.

Multiple Patterns

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

from www.sbac.edu/~tpl/games/gamesact.htm

Make 6 copies of the hundreds chart and color the charts as follows:

1. Put a yellow mark on every 2nd number, starting with 2, i.e., all the even numbers.
2. Put a green mark on every 3rd number, starting with 3, i.e., each multiple of 3.
3. Put a blue mark on every 4th number, starting with 4, i.e., each multiple of 4.
4. Put a purple mark on every 5th number, starting with 5, i.e., each multiple of 5.
5. Put a red mark on every 6th number, starting with 6, i.e., each multiple of 6.
6. Put an orange mark on every 7th number, starting with 7, i.e., each multiple of 7.

Describe any patterns on your six charts.

The Nine-Digit Puzzle

From Historical Connections in Mathematics, Volume II, page 85,

Find at least 30 different equations of the form $_ + _ = _$ by using the numbers 1 - 9 only once in each equation, e.g., $1 + 2 = 3$.

1 2 3

4 5 6

7 8 9



Roll a 10 Game

Real Math - PTA Cube Package - Grades K-6,
www.sraonline.com/products.html?tid=10&sid=2227
ISBN: 9780026744553 MHID: 0026744554 Price: \$11.58

Materials: Two 0-5 dice, two 5-10 dice or four standard 1-6 dice
Objective: To find two numbers whose sum makes 10.

Roll four cubes and try to find two of them whose sum is 10.



from commons.wikimedia.org/wiki/File:Two_red_dice_01.svg

Changing a Quarter

Adapted from Historical Connections, Vol II, page 30.

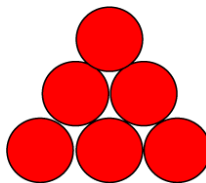
A clerk tired of making change for a quarter, made the following offer to each child who asked for change for the vending machine. "If you can tell me how many ways change can be made for a quarter," he chuckled, "I'll give you two special dice" (one inside the other).




Learning Resources Dice in Dice

Find the Difference - nrich.maths.org/6227

Place the numbers 1 to 6 in the circles so that each number is the difference between the two numbers just below it.



Example:  $5 - 2 = 3$

For children who want more of a challenge, add another row (nrich.maths.org/927).

Number Bracelets

From www.geom.uiuc.edu/~addingto/number_bracelets/number_bracelets.html

Imagine that you have lots of beads with numbers 0 to 9.



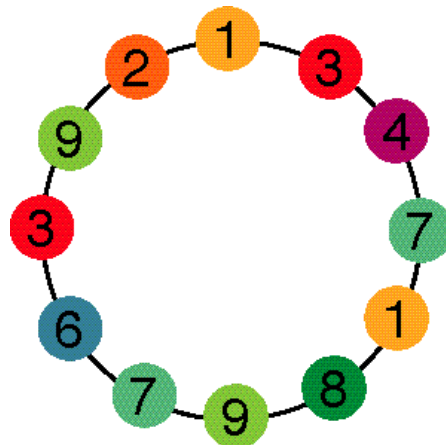
Start with any two beads, e.g.,



Add the two numbers and record just the digit that appears in the ones place in the sum until the pattern repeats.



Attach the end to the beginning, excluding the repeating pattern.

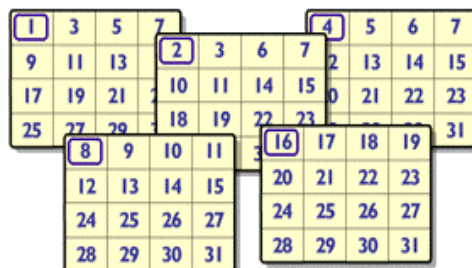


1. How many different starting pairs of beads are there?
2. Make some bracelets. How many beads are in the bracelets you created?
3. Investigate odd- and even-number patterns in all your bracelets.
4. If you start with two beads with different numbers, e.g., 2 4 and 4 2, but in the opposite order, do you get the same bracelet?
5. What's the shortest bracelet you have found?
6. What's the longest bracelet you have found?
7. How many different bracelets are there?

For another version of this problem, visit www.galileo.org/math/puzzles/IrritatingThings.htm.

"Guess the Number" Magic Card Trick

Perform magic by creating magic cards based on the binary representation of numbers.



from www.edb.utexas.edu/resources/mathclub/magicktrick/

- www.edb.utexas.edu/resources/mathclub/magicktrick/ (base 2 number - pdf for creating cards)
- blog.coincidencetheories.com/?p=1522 (base 3 numbers)
- gwydir.demon.co.uk/jo/numbers/binary/cards.htm (online version)



Simplified Krypto

I loved playing Krypto when I was in Junior High School. The Krypto deck consists of 56 cards: three each of numbers 1-6, 4 each of the numbers 7-10, two each of 11-17, one each of 18-25. You can play Krypto with a standard deck of cards. If you use a standard set, consider taking out the picture cards or having Jacks be 11, Queens be 12 and Kings be 13.



1. Deal each player 5 cards.
2. Then select an additional card, which is the "target".
3. Your task is to find a way to combine 2 or more cards (each card used at most once) using arithmetic operations (+ - x /) to yield the target value. The more ways to compute the target value, the better.

Make the game easier by only using cards numbered 1 through 5 or 10 and just + and -. Make the game harder by making each player use all 5 cards.

Delightful Websites

There is a wealth of websites with inspirational activities, games, problems, and puzzles, many of which offer material free of charge. If you know or run across other sites, please [me know](#), by emailing (nancyZ@Zmathdelights.org - remove both Z's from the address) or faxing me (1-650-348-8997).

NRICH - nrich.maths.org



On the wonderful NRICH website you will find thousands of free mathematics enrichment materials (problems, puzzles, games, and articles) for teachers and geared for learners from ages 5 to 19 years. All the resources are designed to develop subject knowledge, problem-solving and mathematical thinking skills. You can search the NRICH website for material of a specified level or type. For guidance on how to find resources that suit your needs, go to the [Help section](#) of the site.

Galileo Educational Network - www.galileo.org/math/puzzles.html



Galileo Educational Network website includes puzzles and problems from their math fairs, which are non-competitive, student-oriented festivals in which children of different abilities do math.

AIMS Puzzle Corner - www.aimsedu.org/Puzzle/

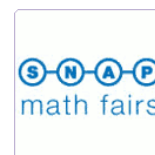
The AIMS Puzzle Corner provides over 100 interesting math puzzles that can help students learn to enjoy puzzles and the mathematics behind them. The puzzles are categorized by type, and within each category are listed in order of increasing difficulty. The puzzles have not been assigned grade levels of appropriateness because AIMS Educational Foundation has discovered that the ability to solve a puzzle varies by individual not grade level. <file:///Users/nb/Desktop/2009%20PMWC%20tryouts%20problems.pdf>



SNAP Math Fairs - www.mathfair.com/puzzles.html

SNAP Math Fair offers challenging, age-appropriate and engaging puzzle problems. SNAP math fairs are designed to be:

- **S**tudent-centered,
- **N**on-competitive,
- **A**ll-inclusive, and
- **P**roblem-based.



Computer Science Unplugged - csunplugged.org

Computer Science Unplugged teaches principles of computer science such as the [binary representation of numbers](#), [algorithms](#) and [data compression](#) through games and puzzles that use cards, string, crayons and lots of running around. In addition to free downloadable material, the website includes videos showing how their materials have been used for children.



Noyce Foundation Problem of the Month

The Noyce Foundation provides wonderful problems to their public-school partners. I would appreciate their making their problems of the month, www.noycefdn.org/pom.php, freely available to anyone. If you like the Noyce Foundation materials, please let them know.



The Noyce Foundation was created by the Noyce family in 1990 to honor the memory and legacy of Dr. Robert N. Noyce, co-founder of Intel and inventor of the integrated circuit which fueled the personal computer revolution and gave Silicon Valley its name.

In recognition of Bob's concern about the shrinking pipeline of students interested and committed to science-related careers, the Noyce Foundation has focused on math, science, and supporting work in research and policy. Much of our focus has been on improving instruction in math, science, and early literacy in public schools.

My goal in providing you with delightful math resources is to stimulate primary school children, their parents, and teacher's interest and curiosity. Like the [Elementary School Math Club at the University of Texas at Austin](#), I hope "exploring and playing with math will result in a positive attitude toward the subject that will serve [children] well throughout their formal education and beyond." For this [article](#) and more delightful mathematical materials, visit MathDelights.org. Please let me know of other engaging math materials, resources, and web pages.

Nancy Blachman, Founder MathDelights.org

Email: nancyZ@Zmathdelights.org (remove both Z's from the address)

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