

Beyond the Textbook: Math Activities That Enrich and Extend

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Variations on Existing Games

- Academic "Go Fish"
- Battleship
- BINGO
- The Dots Game
- From A-Z
- Paper Plate Memory
- Pictionary

ARITHMETIC BATTLESHIP

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BINGO

21	14	6	16	10
12	36	3	1	5
2	11	50	17	43
24	33	38	7	4
30	32	44	19	22

The Dots Game

•	•	•	•	•
•	•	•	•	•
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High Five

Materials:

- three standard dice
- two operation dice (can be made by putting tape on standard dice and writing on them)

Directions:

- Take turns rolling the dice.
- In each turn, you may roll up to three times. You may roll all five dice each time or only roll selected dice.
- Try to get the highest total using the operations and numbers in any order you wish.
- Record your points at the end of each turn.
- The person with the highest score after five rounds wins.

High Five Score Sheet

Round	Score
1	_____
2	_____
3	_____
4	_____
5	_____
Total	_____

A Trick with Two Rings

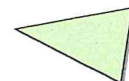


- Tape two circles together like you are forming a chain.
- Make a prediction: What can we form from this?
- Cut along the center line of one circle. What did it look like? What will it look like if we cut the center line of the other circle?
- Cut along the center line of the other circle. What is the resulting shape? How did it work?

A Hands-on Proof

How can you show that the sum of the interior angles of any triangle equals 180 degrees?

Materials: scissors, paper, pencil, ruler, protractor



Marble Madness

- Two straws
- One wrapping paper roll
- One paper towel roll
- Tape
- Scissors
- Toothpicks
- One marble



Paper Towers

- How tall can you go?
 - 6 sheets of paper, 8.5" x 11"
 - 20 inches of transparent tape
 - Scissors
 - Free standing
- How strong can it be?
 - One foot of masking tape
 - One sheet of typing paper
 - One pair of scissors
 - About 20 or so textbooks to test the strength of the towers
 - Free standing, minimum height: 1 inch



Treasure Sorting

- Examples of "treasures": rocks, old buttons, bread tags, stuffed animals
- Sort by attributes
- Make Venn Diagram using rope



Source: *Treasure Boxes* by Jaine Kopp and Kimi Hosoume

What's a Name Worth?

- If A = one penny, B = two pennies, etc., what is your first name worth?
- What is your last name worth?
- How did you figure it out?
- What is the most expensive name you can think of?
- What is the least expensive name you can think of?
- Can you think of a name that costs exactly 43 cents?

Guess My Birthday!

Card 1:
 1 3 5 7 9 11 13 15
 17 19 21 23 25 27 29 31

Card 2:
 2 3 6 7 10 11 14 15
 18 19 22 23 26 27 30 31

Card 3:
 4 5 6 7 12 13 14 15
 20 21 22 23 28 29 30 31

Guess My Birthday!

Card 4:
 8 9 10 11 12 13 14 15
 24 25 26 27 28 29 30 31

Card 5:
 16 17 18 19 20 21 22 23
 24 25 26 27 28 29 30 31

Krypto!

1-10 3 cards each
 11-17 2 cards each
 18-25 1 card each

Sample:
 20, 15, 17, 3, 9 Target: 4

Variations on Krypto!

- Junior Krypto!
- Allow exponents and factorials
- Make target any prime number or any perfect square or cube
- Make every number from 1-25 a target number
- Let one of the five cards be a variable
- Play online:
<http://illuminations.nctm.org/ActivityDetail.aspx?ID=173>

Pick a Year, Any (Well, Almost Any) Year

- Use the four digits in the year to come up with the numbers 0-25 using the four operations (add exponents, roots, factorials if desired)
- Example: 1492
 - $0 = (9 - 1) \div 4 - 2$
 - $1 = (9 + 1) \div 2 - 4$
 - $2 = 9 - 4 - 2 - 1$

Bridge-It

Two players

Objective: Be the first person to the other side of the grid
 One player is X's; the other is O's.

Connect two adjacent letters
 Horizontal or vertical move only

Players alternate turns

Cannot intersect a line

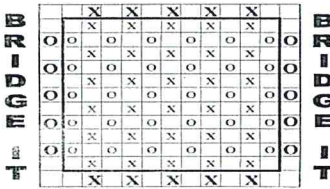
Player with O's wins if she makes a path from top to bottom

Player with X's wins if she makes a path from left to right

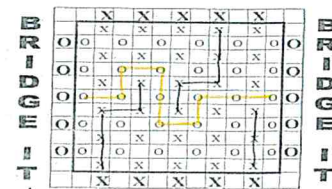
Modified Version: Limit the number of bridges



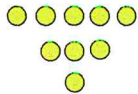
Bridge-It



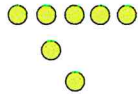
Bridge-It



Nim



Nim



Nim



Nim



Nim



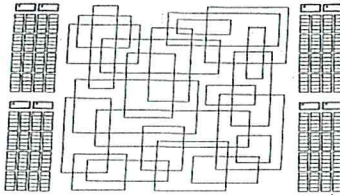
Nim

- Any winning patterns?
- Better to go first or second?
- What if taking the last piece results in victory?

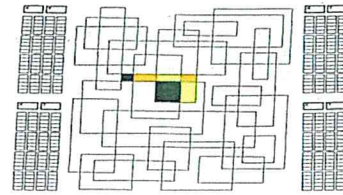
The Rectangle Game

- 2-4 players
- Shade one figure
- You must shade a figure adjacent to an opponent
- You may not shade a figure adjacent to one you've already shaded
- Make a rectangle – get one point for every figure in that rectangle

The Rectangle Game

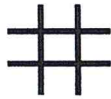


The Rectangle Game



Tic-Tac-Toe 15

- Player 1:
1, 3, 5, 7, 9
- Player 2:
2, 4, 6, 8, 10



Questions about Terminating and Repeating Decimals

1. What is a rational number?
2. Use your calculator to change $1/43$ to decimal form. Is the displayed result an exact value or is it rounded? How can you tell?
3. If you convert a given fraction to its decimal form, which could the result be: terminating; non-terminating and repeating; non-terminating and non-repeating?
4. Predict whether given fractions can be represented by repeating or terminating decimals. Explain.
5. What is the maximum number of decimal places necessary before the decimal representation of a rational number will either repeat or terminate?

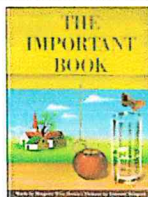
Games with Playing Cards

- Digit Draw Games
 - 3-digit addends; sum closest to a target
 - Division; goal is smallest remainder
- Variations on War
 - Largest product wins
 - First to state product wins
- Target
 - Krypto! with playing cards
 - Let red cards be negatives



The Important Book (Brown)

- The important thing about X is...
- Additional details
- But the important thing about X is...



Fibonacci Sonnet

Source: Bruce Holland Rogers

Pen. Paper. Steady hands. Write a word. Write another word after that. Then, write two words to make a sentence. Next, write a three word sentence, followed by a sentence of five words. Pretty soon you're finishing your eight word sentence, your thirteen word sentence, topping it off with a whopping twenty-one word sentence! The next paragraph should be shorter than the last – you're going backwards now. Thirteen, eight, five, three, two, one, and one. It ends like it begins. With a word. You're finished. Done. Finito.

Jump Rope Geometry

<http://jumpropegeometry.blogspot.com/>



Games for Purchase

- Batik (spatial reasoning)
- Blokus (strategy)
- Bump: The Sneaky Numbers Game (counting, strategy)
- Clue: The Great Museum Caper (strategy and problem solving)
- DaVinci's Challenge (strategy and spatial reasoning)
- Equate and 'SMath (arithmetic)
- Make 'n' Break (spatial reasoning)
- Mentology (visual and memorization)
- Muggins math games

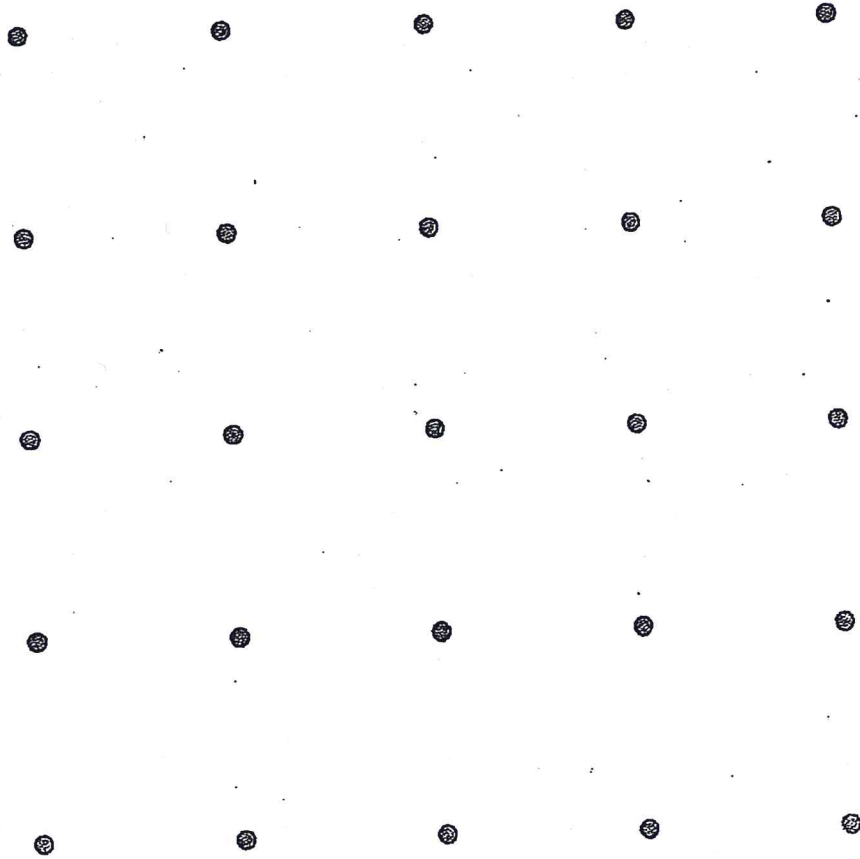
Games for Purchase

- Qwirkle (spatial reasoning)
- River Crossing (problem solving)
- Rush Hour (problem solving)
- Set (visual patterns)
- Spy Alley (strategy)
- Stay Alive (strategy)
- Stock Rush! (stock market)
- Sudoku 2 (problem solving)
- Tic-Tac-Chec (intro to chess moves; problem solving)
- Tip-Over (problem solving)

BATTLESHIP

	A	B	C	D	E
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

BINGO



A=

B=

C=

D=

E=

F=

G=

H=

I=

J=

K=

L=

M=

N=

O=

P=

Q=

R=

S=

T=

U=

V=

W=

X=

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1=

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7=

8=

9=

10=

11=

12=

13=

14=

15=

16=

17=

18=

19=

20=

21=

22=

23=

24=

25=

BRIDGE IT

		O		O		O		O		O		
		O		O		O		O		O		
X	X		X		X		X		X		X	X
X	X	O	X	O	X	O	X	O	X	O	X	X
X	X	O	X	O	X	O	X	O	X	O	X	X
X	X	O	X	O	X	O	X	O	X	O	X	X
X	X	O	X	O	X	O	X	O	X	O	X	X
X	X	O	X	O	X	O	X	O	X	O	X	X
X	X	O	X	O	X	O	X	O	X	O	X	X
		O		O		O		O		O		
		O		O		O		O		O		

BRIDGE IT

