Math Circle-type activities in K-5 intervention classes

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Math at Brown Street Academy, Milwaukee

- Math Proficiency 2.9%%300+ rank in 345 ranked Elementary / Middle / High schools in Milwaukee County

- What does a Mathematician Look Like? – efforts to help kids see themselves as mathematicians

led by Danielle Robinson – math intervention specialist

https://uwm.edu/education/what-does-a-mathematician-look-like/

Visits to Brown Street Academy

- 40 minute 'intervention' classes in grades 2,3,4 and 5;

- Typically 6-8 students in each group

- Questions from the students — growth mindset

- Math Circles — mathematically rich activities, games, puzzles

Super Farmer

Designed by Polish mathematician Karol Borsuk during World War II.

The original copies of the game burned together with the whole town during the Warsaw Uprising in August 1944. One copy survived outside Warsaw, and many years later was returned to the Borsuk family.

You want to be super farmer. Your animals multiply and you can exchange them for some other animals if you decide that it is profitable.

To win the game you must possess a herd consisting at least of a horse, a cow, a pig, a sheep and a rabbit — but be careful, a fox or a wolf can take some of your animals away!

If the two dice show the same animal, the player gets that animal from the main herd. If the dice match animals that a player already has, she receives as many new animals (of the same kind) as she has full pairs of this species including the one on the dice plus any already owned.

Before each throw of the dice a player can make exchanges with the main herd.
If the main herd runs out of certain animals, a player will not get his or her full share.

Rich tasks with Super Farmer

Genuinely fun game for both kids and adults

Strategies: hoarding rabbits
            buying protectors (small and big dogs)
            getting a horse

Many questions: How many rabbits is a horse/cow/pig worth?
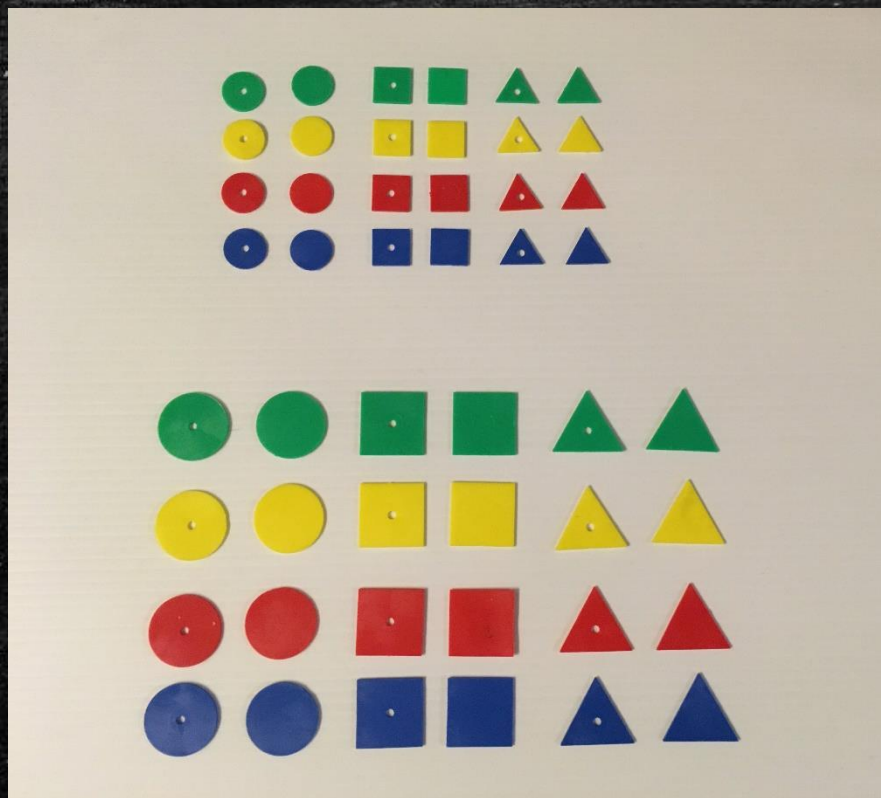   How many rabbits do you need to win the game?
                (Are there that many rabbits in the herd?)

After playing many games, the students naturally started to ask these
questions.

Dienes Logic Blocks

Zoltan P. Dienes – math education with concrete activities
Blocks widely used in elementary schools in Hungary
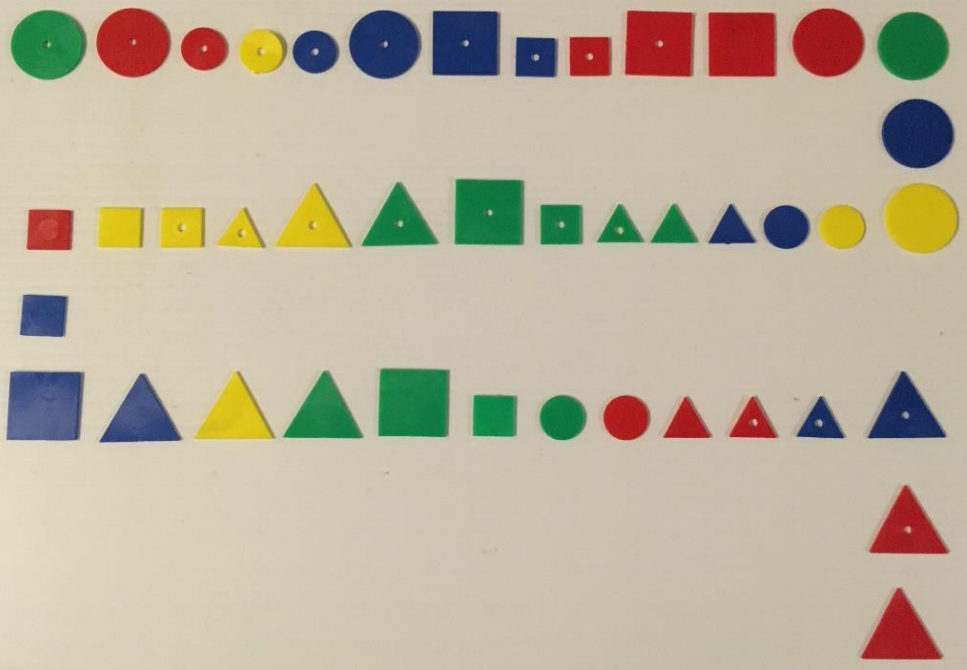
Activities with Dienes blocks

Make teams (sorting activities)

Make patterns

20 Questions – yes/no questions to find which block someone chose (play it out)
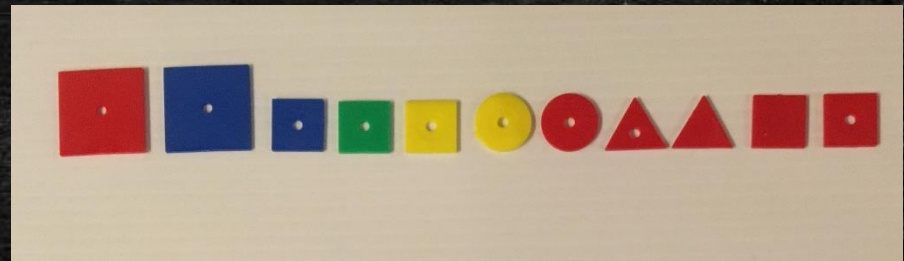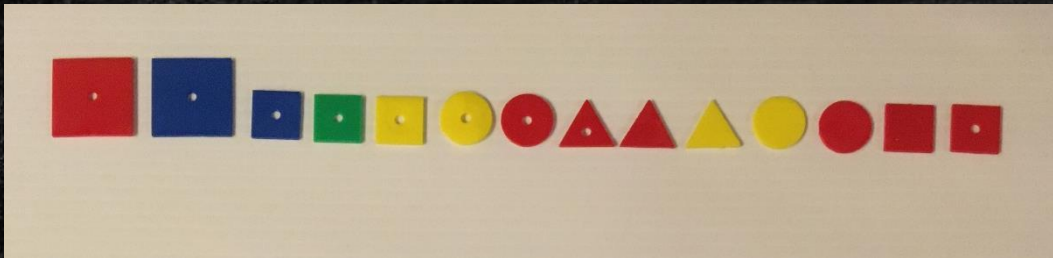20 Questions on the Island of Knaves

# Make sequences — neighboring blocks differ by exactly one attribute (two/three/four)

Many interesting questions posed about the one attribute difference sequence:

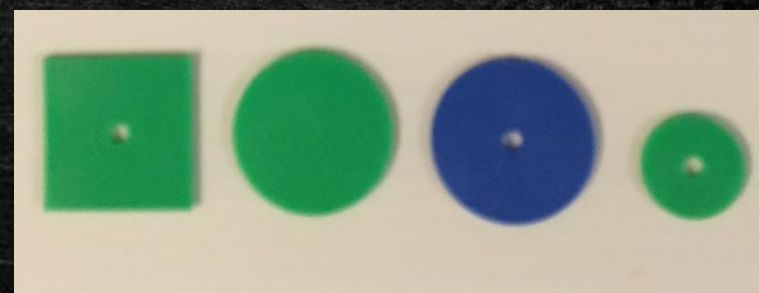Can you always use up all blocks in the sequence?

If you cannot, what is the shortest sequence that cannot be continued?

Take two blocks and connect them by a sequence in which neighboring blocks differ by exactly one attribute
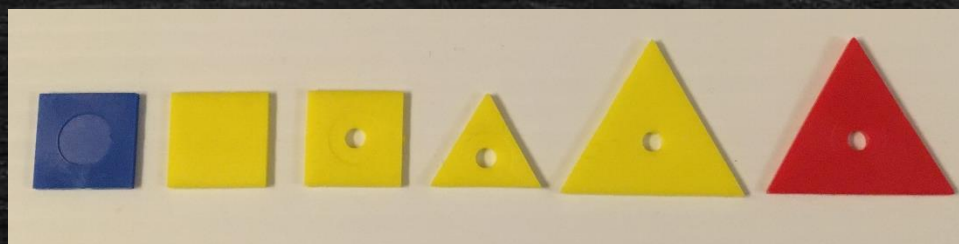
Odd Man Out

Dicey numbers

Find those numbers (Klara Pinter):

Roll two/three dice, and make up a two/three digit number from the numbers rolled.
Find and record 6 properties of this number.
Now roll three dice, and take the properties that correspond to the numbers thrown. Find all two/three digit numbers that have these properties.

Example: Using 3 dice someone rolled 1,2,3 and made the number 123.

Properties:

1 the number is odd

2 its digits are increasing left to right

3 it is 100 when you round it to the nearest hundred

4 the sum of the digits at the hundreds place and the tens place is the digit at the ones place

5 it has exactly two digits that are prime

6 it does not end in 0

Now assume that you roll 2,3,5. Which three-digit numbers have properties 2, 3 and 5?
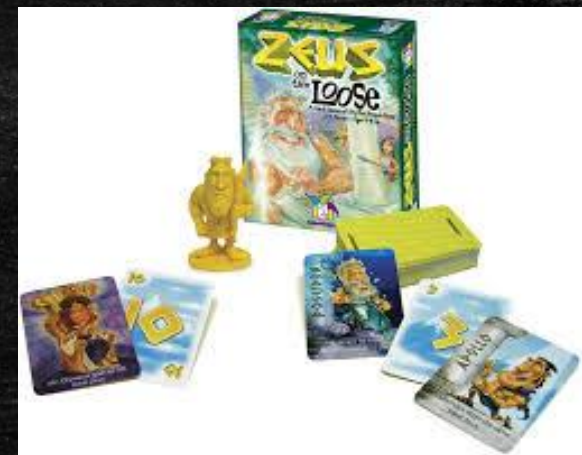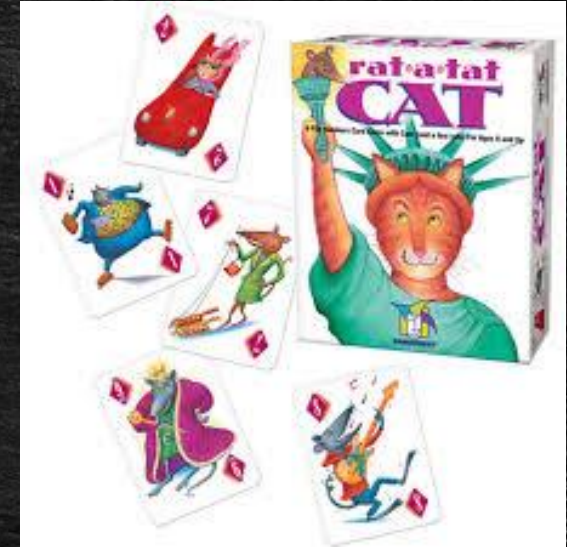
5-card magic trick

front

| 1 | 2 | 3 | 4 | 5 |

back

| 6 | 7 | 8 | 9 | 10 |

A volunteer throws up the 5 cards in the air, and then tells you how many black cards they see.

Without looking at the cards, you can now tell the sum of all the numbers they see.

Many more fun games

THANK YOU !

References:

If you have any questions, please contact: gapinter@uwm.edu