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# BETWEENERS

LEVEL:	Grade 3 - 4
CONCEPTS:	ordering whole numbers and decimals, analytical thinking; <i>Variation</i> - order of operations, PEDMAS
PLAYERS:	3 or 4
EQUIPMENT:	1 x 3-in-a-cube die per player, 1 recording sheet per player
GOAL:	to have a between number in each round

### **GETTING STARTED:**

To begin, each player records the names of all the players in the round on their recording sheets. All players shake their 3-in-a-cube die. On **STOP** players peek at their die, mentally figure all possible 3-digit numbers they can make from their roll and then record one of the possibilities next to their name on their recording sheet. Players then announce their numbers and record every player's number next to that player's name on their gameboard. Players compare all the recorded numbers in the round.

#### EXAMPLE:

#### STRATEGIZING...

Player	Roll	Number
Јони	4,5,6	456
Jane	1,2,3	321
Norm	1,4,5	415

Jane: "321 is the <sup>O</sup><sup>®</sup> greatest I can make but has the best chance to be the **BETWEEN** number for the round."

math thinking

Norm: "541 is too large to win, 145 is too small to win, my best chance is either 451 or 415. 415 is closer to the middle and is my best chance to be the **BETWEEN** number.

"John's 456 is **GREATEST**. Jane's 321 is **LEAST**. Norm's 415 is **BETWEEN** 321 and 456." Players circle 415 and Norm earns a point for the round.



- 1. Four Player Version Rules and scoring remain the same, however there can be two between numbers in a round, with two players earning points if their numbers fall between the greatest and least for the round.
- 2. Students must place a decimal point in their number (eg roll 4,6,1 : 46.1, 4.61, .461) Rules and scoring remain the same.

# BETWEENERS



- 1. Players must make the largest number they can with their roll. They compare their numbers and the BETWEEN number wins a point.
- 2. Players roll one 10 sided double dice and play a 10's and 1's version. Players must decide which die (inside or outside) will represent the 10's and 1's place. Rules and scoring remain the same.



1. Players use their three numbers in a math sentence with the goal of having their answer being between the answers of their opponents.

EXAMPL	.E:		(math thinking )
PLAYER	Roll	Number	John: "What makes a good <b>BETWEEN</b> answer? I'm
Јони	4,5,6	5 × (6 - 4) = 10	math
JANE	1,2,3	(2 + 1) × 3 = 9	SCORES 1 POINT
Norm	1,4,5	5 + 4 - 1 = 8	lane: "2, 2 and 1 are small numbers as Laged
		m	to maximize the answer I can get with them."

O Norm: "Answers around 7 or 8 have been winners in the past few rounds so I want an answer close to those."



John: " I first subtracted 4 from 6 so I had to place that in parentheses. I then multiplied the difference of (6-4) by 5 to get an answer of 10."

Jane: "I placed 2+1 in parentheses because I wanted to have that done first so I could multiply the sum of (2+1) by 3 to give me a product of 9 for an answer."

Norm: "I added 5+4 to get 9 then subtracted the 1 to get a final answer of 8."

Jane scores 1 point for having the "between answer".

### **JOURNAL WORK & EXTENSIONS:**

1. Explain what would be the ideal **BETWEEN** number if you used two 10-sided double dice?

## BETWEENERS & CUBIC MYSTERY RECORDING SHEET

PLAYER	NUMBER	PLAYER	NUMBER	PLAYER	NUMBER
FLATER		FLATER	NOWBER	FLAILN	NOWBER
PLAYER	NUMBER	PLAYER	NUMBER	PLAYER	NUMBER
PLAYFR	NUMBER	PLAYFR	NUMBER	PLAYFR	NUMBER

# TICK TOCK ROLL A CLOCK

LEVEL:	Grade 3 - 5
CONCEPTS:	mixed operations, addition, subtraction, multiplication, division; PEDMAS
PLAYERS:	2 cooperatively; or solitaire
EQUIPMENT:	1 x 3-in-a-cube die, recording sheet
GOAL:	to cross off all numbers on the clock in twelve rolls

### **GETTING STARTED:**



Players either draw a clock or use the recording sheet. Play begins by rolling the 3-in-a-cube die and recording the numbers. Players must use all three numbers in a math sentence who's solution eliminates one of the numbers on their clock. Players can use +, -, × and  $\div$ . All numbers rolled must be used, and can only be used once.



Only one clock number can be crossed off per roll. Players continue to roll for new combinations, each time analyzing all possibilities, and crossing off their best open number. If players are unable to find a combination for any remaining numbers, they must record an extra roll.



As students become more proficient with the strategy and probability in the game, change the **GOAL**. Replay with the following challenge:

Players can cross off as many numbers as possible with each roll. All numbers must be used and used only once. *Ask* - What's the fewest number of rolls that allow you to cross off all the numbers on your clock? Allow all operations, exponents, integer values.



## TICK TOCK ROLL A CLOCK

### **JOURNAL WORK & EXTENSIONS:**

8

6

1. Can you find a combination that will allow you to cross off all twelve numbers in one roll?



2. Are there certain numbers that are more difficult to cross off? Explain or give examples.



7.

8.

11.

12.



**CONCEPTS:** fact fluency, addition facts to 12, subtraction facts from 6, tallying **HIII** = 5

EQUIPMENT: 1 x double regular dice, recording sheet

GOAL: to cross off all numbers on the clock in as few rolls as possible

### **GETTING STARTED:**

Players roll the double die and record the two numbers. Player can choose to either add the two for a sum and cross off that answer or subtract the two and cross off the difference.

#### Example:



Player may cross off 6 + 2 = 8 or 6 - 2 = 4

Players tally after each roll. If a player cannot cross off any number, they still must tally and count it as a roll.

### JOURNAL WORK AND EXTENSIONS:

- 1. Have students total the number of tallies (rolls) it took them to cross off their clock. Students can add their data to a class graph. As a class they can get a sense of approximately how many rolls it takes to cross off all numbers.
- Discuss with students which rolls should definitely be used for addition. Have them justify their thinking, eg 6 + 5 = 11; there is only one way to make 11, and that is with addition, whereas there would be many ways to cross off a difference of 1: 6 5 = 1, 5 4 = 1, 4 3 = 1,3 2 = 1, 2 1 = 1, many options.



3. With students, construct an outcomes chart of all addition combinations and an outcomes chart for all subtraction combinations using a 6 sided die.



4. Primary students needing an extra challenge can use the 3-in-a-cube die. The goal is to still try to cross off the clock in 12 rolls, then later in as few rolls as possible. Players can use addition and subtraction only as follows:



## TICK TOCK ROLL A CLOCK RECORDING SHEET



Extra Rolls

# **ORDER IN THE COURT**

LEVEL:	Grade 3 - 5
CONCEPTS:	ordering fractions, equivalent fractions, fractions less than one and greater than one, analytical thinking <i>Variation:</i> Primary - naming fractions to <sup>1</sup> / <sub>6</sub> , Middle Years - decimal equivalents, mixed numbers
PLAYERS:	1 vs 1
EQUIPMENT:	1 x double regular die per player, 1 recording sheet per player
GOAL:	to order a series of 5 fractions from least to greatest

### GETTING STARTED:

Player One rolls the die and uses the two numbers to create a fraction less than one, then records it on an open space in the Least to Greatest gameboard. Students may use fraction pieces or the Fraction Decimal Percent Chart on page 100 to help them make decisions. Player Two takes their turn rolling the die, creating a fraction less than one and recording it on their gameboard. Players record their fractions as rolled. If they roll a 4 and a 6, they record 4/6. Teachers may choose to have students convert their fractions to equivalent fractions with smaller denominators (<sup>4</sup>/<sub>6</sub> rolled, <sup>2</sup>/<sub>3</sub> recorded). If a player's roll creates a fraction that is equivalent to one already on their gameboard, they have to record it in the "rejects" section of their gameboard. Players continue taking turns. A player wins the round if, at the end of equal turns, they are the first to have recorded, in order from least to greatest, five non-equivalent fractions. A player "strikes out" if they roll a third reject. The player who wins the most rounds wins the game.

> ROUND FOUR PLAYER TWO LEAST GREATEST math talk "1/2 is greater than 2/6 and less than 3/5" REJECTS STRIKE OUT! 1. Use 12-sided double dice. Allow fractions greater than one to be used by 2. designating the outside (top) number of a double regular die as the = 6/4 numerator and the inside (bottom) number as the denominator.-

3. Use a 3-in-a-cube die to create mixed numbers such as  $3\frac{1}{2}$ .



Roll five double regular dice at once and build proper fractions. Players line them up from least to greatest, stacking equivalent fractions on top of each other. Record the rolls on **PRIMARY** the gameboard, circling equivalent fractions.



## **ORDER IN THE COURT**



Players record the decimal equivalent (to 2 places) on the gameboard just below the fraction. They can use this decimal variation for all versions of the game.



## **ORDER IN THE COURT RECORDING SHEET**

ROUND ONE PLAYER ONE	ROUND ONE PLAYER TWO
LEAST GREATEST	LEAST GREATEST
REJECTS STRIKE OUT!	
ROUND TWO PLAYER ONE	ROUND TWO PLAYER TWO
LEAST GREATEST	LEAST GREATEST
ROUND THREE PLAYER ONE	ROUND THREE PLAYER TWO
LEAST GREATEST	LEAST GREATEST
ROUND FOUR PLAYER ONE	ROUND FOUR PLAYER TWO
LEAST GREATEST	LEAST GREATEST
REJECTS STRIKE OUT!	