



Commit Four

An order of operations activity with dice

Stage 4 Mathematics



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Commit Four

An order of operations activity with dice.

SYLLABUS REFERENCES:

NS4.2: Compares, orders and calculates with integers (pg 58)

Key Idea: Simplify expressions involving grouping symbols and apply order of operations

WMS4.4: Identifies relationships and the strengths and weaknesses of different strategies and solutions, giving reasons (*Reasoning*) (pg 17)

MATERIALS REQUIRED

- Each student is given their **own score sheet** (or they may write their own)
- Students must record on their sheet in **pen** so that answers can not be changed at the end
- A **six-sided numeral or dot die (1-6)**

TIME REQUIRED

- The first time the activity is played will take about **25 minutes** allowing for teacher instructions and class discussion
- Once students are familiar with the activity, allow **10–15 minutes** depending on the ability level of the class and the selection of operations which can be used

GROUPING

- Teacher led whole class activity: students working **individually or in pairs**
- Small group activity: 1 – 4 students individually



AIMS OF THE GAME

- To use **order of operations** to make the largest possible digit for each combination of four numbers rolled (using a 6-sided die)
- Students to use their digits formed to make the **largest possible four digit number**

PLAYING THE GAME

- The teacher throws a die 4 times - students record each throw in order on their score sheet
- Students are then given a fixed amount of time (≈ 1 minute) to use the 4 numbers and a selection of operations to make an **expression** that will give the largest possible single-digit answer (i.e. aim for 9!)
- When the teacher says '**commit**', students must record their expression and answer in the appropriate columns on their score sheet
- This process is then repeated five more times
- Once the students have recorded their answers for all 6 rounds, the die is then thrown again. The number uppermost on the die indicates which round's **answer** the student must place in one of the **four squares** at the bottom of the score sheet to make their final **4-digit number** (remember the aim is to make the largest 4-digit number)
- This process is then repeated three more times
- The student with the **largest 4-digit number wins!**

VARIATIONS

- Change the aim of the game to make the **smallest** 4-digit number possible (also the smallest possible digit for each combination of four numbers rolled)
- Throw 4 dice at once – students can use the **numbers in any order** to make their expression
- Change the operations students are allowed to use:
 - First time activity played: +, -, x, \div
 - Subsequently: +, -, x, \div , ()
 - Extension: +, -, x, \div , (), $\sqrt{\quad}$, powers (numbers rolled can be used as a power),
- Use a ten-sided die (0 – 9)

N.B. To adapt this activity to cater for students working at Stage 3, use + and – only.

Commit Four

Round	Numbers Rolled				Expression	Answer
1						
2						
3						
4						
5						
6						

Final 4-digit Number:

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Round	Number Thrown				Expression	Answer
1						
2						
3						
4						
5						
6						

Final 4-digit Number:

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Commit Four

Round	Number Thrown				Expression	Answer
1						
2						
3						
4						
5						
6						

Final 4-digit Number:

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Sample student responses:

Commit Four (+, -, x, ÷)

Round	Numbers Rolled				Expression	Answer
1	1	1	2	2	$1 + 1 + 2 \times 2$	6
2	4	5	2	3	$-4 + 5 \times 2 + 3$	9
3	1	5	6	2	$1 + 5 + 6 \div 2$	9
4	3	2	1	3	$3 \times 2 - 1 + 3$	8
5	3	6	5	5	$3 + 6 + 5 - 5$	9
6	2	3	4	5	$2 - 3 + 4 + 5$	8

Numbers rolled by the teacher were 1, 3, 4 and 6:

Final 4-digit Number:

9	8	8	6
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Commit Four (+, -, x, ÷ and brackets)

Round	Number Thrown				Expression	Answer
1	1	1	2	2	$1 + (1 + 2) \times 2$	7
2	4	5	2	3	$(4 + 5) \times (-2 + 3)$	9
3	1	5	6	2	$1 \times 5 + 6 - 2$	9
4	3	2	1	3	$3 \times (2 - 1) \times 3$	9
5	3	6	5	5	$(3 + 6) \times (5 \div 5)$	9
6	2	3	4	5	$2 + 3 \times 4 - 5$	9

Numbers rolled by the teacher were 1, 3, 4 and 6:

Final 4-digit Number:

9	9	9	7
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Commit Four (+, -, x, ÷, brackets, $\sqrt{\quad}$ and powers)

Round	Number Thrown				Expression	Answer
1	1	1	2	2	$1 \times (1 + 2)^2$	9
2	4	5	2	3	$-4 + 5 + 2^3$	9
3	1	5	6	2	$1^5 + 6 + 2$	9
4	3	2	1	3	$3^{(2-1)} \times 3$	9
5	3	6	5	5	$(3 + 6) \times 5 \div 5$	9
6	2	3	4	5	$2^3 \div \sqrt{4} + 5$	9

Numbers rolled by the teacher were 1, 3, 4 and 6:

9	9	9	9
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