

Number Patterns - Reteach



TEKS 4.5(B)

Objective:

I can use a rule to fill in an input-output table, write the numerical expression for any position, and extend the pattern — because the POSITION tells me WHERE I am and the RULE tells me WHAT TO DO to find the value.

The anchor strategy students repeat all lesson: Same machine, every time. (The rule never changes. Feed it a position → follow the steps → get the value. If you get confused, go back to position 1 and walk through the machine slowly. It always works the same way.)

TEACHER NOTES

Students with Dyscalculia or other learning disabilities may especially find this standard difficult. Below are several factors to consider and preparation suggestions.

1. Number magnitude confusion — students may not intuitively sense that 24 is "bigger" than 6, so recognizing a growing pattern is harder. They need the visual (blocks, dots) alongside the numeral.
2. Working memory overload — a two-step rule ("multiply by 3, then add 2") requires holding an intermediate result while performing a second operation. This exceeds working memory limits. They need to write EVERY intermediate step, not hold it in their heads.
3. Symbol confusion — " $n \times 6$ " is abstract. The letter n , the multiplication sign, and the number 6 are three symbols with three different jobs. Students need to physically replace n with the position number before computing.
4. Sequencing difficulty — students may lose track of which step comes first in a two-step rule, or skip a step entirely. They need a fixed, numbered checklist they follow with a finger.

5. Fact retrieval difficulty – multiplication facts may not be automatic, so the cognitive load of recalling 7×6 crowds out the conceptual thinking about positions and rules. Provide a multiplication chart – the goal is the PATTERN concept, not fact fluency.

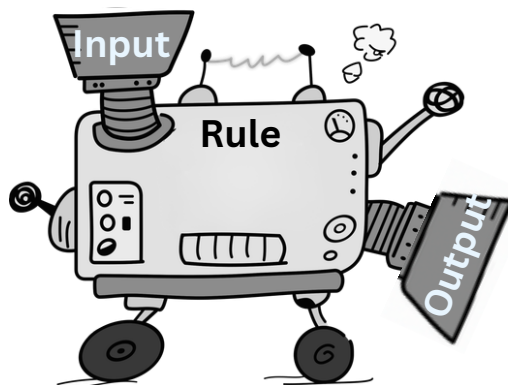
Non-negotiable accommodations to have in place before starting:

- Multiplication chart on the desk (laminated, always available – this is not a crutch; it removes the fact-retrieval barrier so the student can focus on the concept)
- Unifix cubes or counters in groups of one color (for building each position physically)
- The Rule Machine poster (below) printed at desk size, not just on the board
- A dry-erase sleeve or whiteboard for the student to write and erase freely – reduces anxiety about mistakes
- Pencil and highlighter – the student highlights the position number in every row before doing anything else

THE RULE MACHINE – Concrete Version

Before any numbers, build the concept with a physical machine. Use a box or folder with a hole cut in the top (input) and bottom (output). Write the rule on the front. Have the student physically drop a card with a position number in the top, you "apply the rule" inside the box, and hand a card with the value out the bottom.

Then transition to the posted visual:



I DO – One Problem, Very Slowly:

Problem: The rule is "multiply by 4." Laminate and post your function machine. Then, write this rule in the machine.

Teacher script (say each line, wait, point):

Say, "My rule machine says ' $\times 4$.' That means every position number gets multiplied by 4. Watch me."

"Position 1. I highlight the 1. I put it in the machine. 1×4 . I check my multiplication chart: $1 \times 4 = 4$. The value is 4. I write it." (Write 1 in the input part of the machine, then write 4 in the output. Repeat for each position.

We Do – Two Problems, Student Does More Each Row:

Provide the students with their own laminated number machines or the printed function machine worksheet for them to use for their numbers.

Problem 1: The rule is "multiply by 5."

Teacher does position 1 aloud. Student does position 2 with teacher watching. Student does positions 3 and 4 independently while teacher checks. If the student gets stuck, say "What position are you at? Now put it in the machine" – not "the answer is ____." Then have students to complete the table.

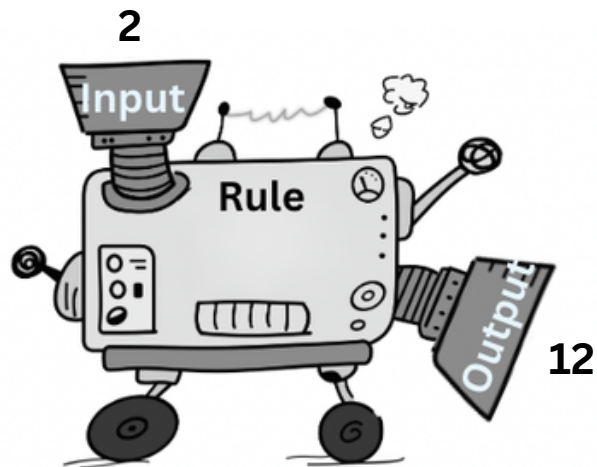
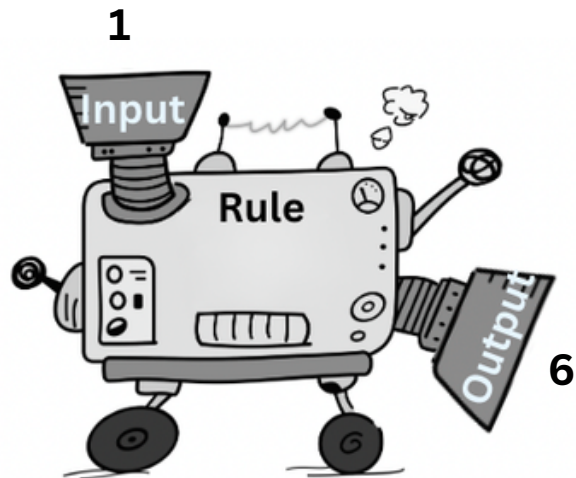
Problem 2 (discovering the rule from a table):

Input	Output
1	6
2	12
3	18
4	24

Say: "Let's be detectives. Position 1 gave us 6. What did the machine DO to 1 to get 6?" (Multiplied by 6.) "Let's check: position 2, did it multiply by 6? $2 \times 6 = 12$ — yes. Position 3: $3 \times 6 = 18$ — yes. The rule is $\times 6$. Expression: $n \times 6$."

Have the student use the multiplication chart to verify each row. Then ask: "Position 7?" ($7 \times 6 = 42$.)

You may also use the function machine to help with a visual representation.



You Do – Two Problems, Student Works Independently:

Provide the table and the function machine worksheet. Students should still complete the table. Multiplication chart stays on the desk. Teacher circulates but does not help unless the student asks.

1. The rule is "multiply by 7." Fill in positions 1–3 and find position 4.
($1 \rightarrow 7$, $2 \rightarrow 14$, $3 \rightarrow 21$. Expression: $n \times 7$. Position 4: $4 \times 7 = 28$.)
2. A table shows: position $9 \rightarrow 36$, with outputs. What is the rule?
(Rule: divide by 9.)

FIND THE ERROR (misconception problems):

The heart of the reteach — review student work as a class. Guide students in finding errors and reteaching each other the correction.

EXIT TICKET:

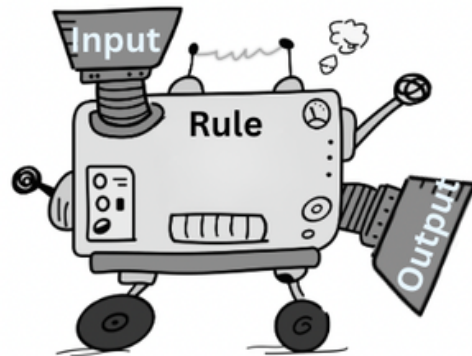
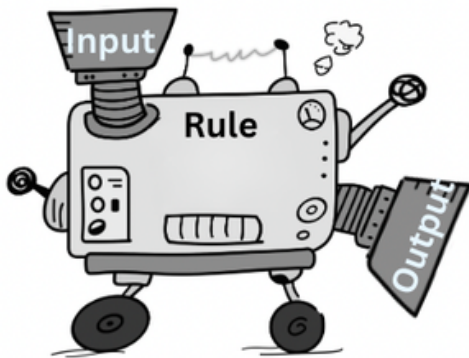
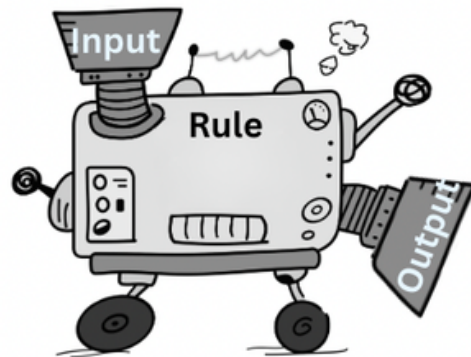
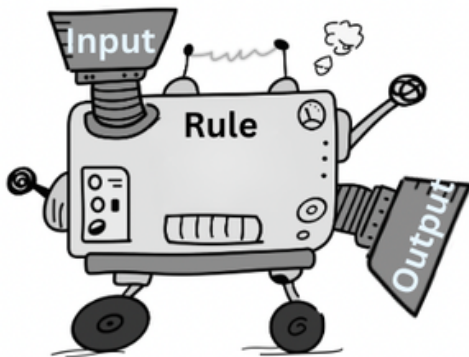
Assign EDMazing Learning's quick check for TEKS 4.5(B).

Number Patterns

WE DO

- 1 Write the rule in the machine. Then put each number in as the input. Use the rule to find the output.

rule is "multiply by 5"



Complete the table below with your input and output values.

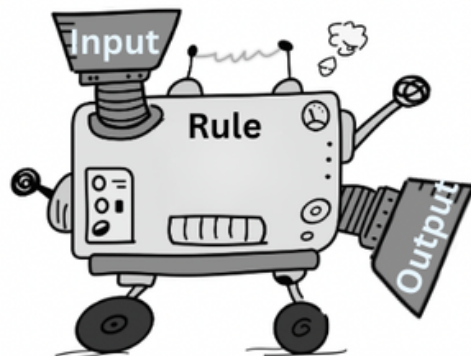
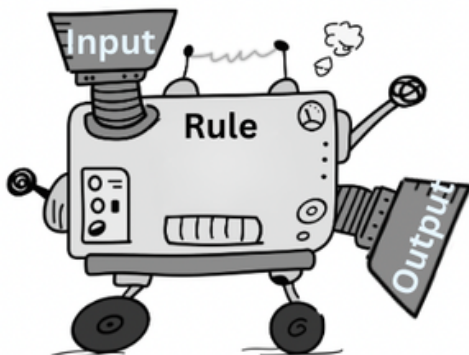
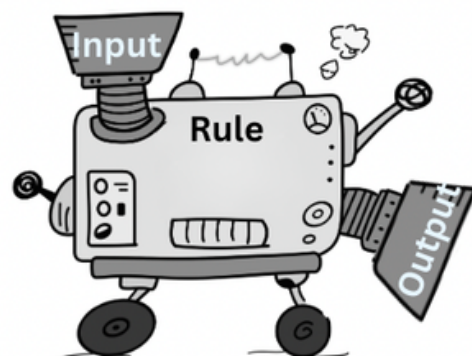
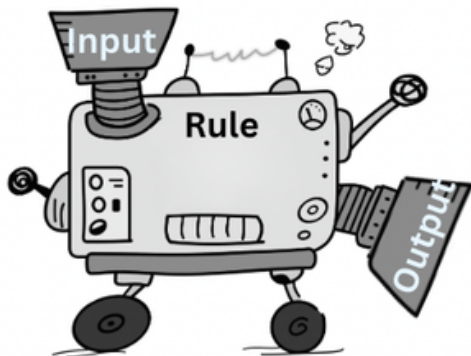
Input				
Output				

WE DO

- 2** The table below is missing its rule. Use the function machines to help find the rule.

Input	Output
1	6
2	12
3	18
4	24

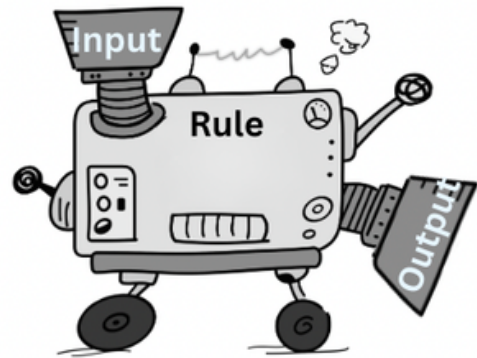
rule: _____



YOU DO

- 3** The table below has a rule of “multiply by 7”. Find the missing output when the input is “4”. You may use the function machine to help.

Input	Output
1	7
2	14
3	21
4	



- 4** The table below is missing its rule. Use the function machines to help find the rule.

Input	Output
9	1
18	2
27	3
36	4

rule: _____

