Grade 6 Mathematics: Algebra and Coding

Free sample lesson

Ontario curriculum: Mathematics (2020), Strand C: Algebra. 18 days.

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This is Lesson 1 of 12 from the full unit, exactly as it appears in the Teacher Guide, followed by the student worksheet. The full unit is at unitplans.ca.

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Lesson 1: Repeating, growing and shrinking patterns

1 day · about 60 minutes · C1.1

> **Learning goal**
>
> - We are learning to sort patterns into repeating, growing and shrinking, and to tell which growing patterns are linear.

> **Success criteria**
>
> - I can name a pattern as repeating, growing or shrinking.
> - I can find the core of a repeating pattern.
> - I can tell whether a growing pattern is linear by checking the change from term to term.

Materials

- Square tiles or linking cubes
- Chart paper
- Pattern cards (made-up sets)

Minds On (10 min)

1. Show the shape pattern triangle, circle, circle, triangle, circle, circle. Ask: "What will the 10th shape be, and how do you know without drawing all ten?"
2. Collect ideas: students notice the core of three shapes keeps repeating.

Action (35 min)

1. Sort pattern cards into three piles: repeating, growing, shrinking. Name the core of each repeating pattern.
2. Build tile figures 1 to 4 of a growing pattern. Record the number of tiles in each figure and the change from one figure to the next.
3. Introduce "linear": the change is the same every time. Test 2, 4, 8, 16, 32 and 5, 9, 13, 17.
4. Students complete the worksheet.

Consolidation (15 min)

1. Discuss question 4: why is 2, 4, 8, 16, 32 growing but not linear?
2. Exit: "Is the pattern 3, 6, 12, 24 linear? Give a reason."

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Questions to ask

- What stays the same in a linear pattern?
- How can you check the 20th term of a repeating pattern without writing 20 terms?
- Does a pattern that grows fast have to be linear?

Watch for

- Students often call any growing pattern linear. Have them compute the change each time and compare.
- Students sometimes count the core wrongly. Ask them to circle one full core before extending.

Differentiation

Support	Extend
Use tiles and a recording table so the change is easy to see. Mark one core with a coloured bracket.	Create a growing pattern that is not linear and a shrinking pattern that is linear, and explain the difference.

Answer key: Worksheet 1: Repeating, growing and shrinking

1. The pattern is: triangle, circle, circle, triangle, circle, circle, and so on. What is the 17th shape?

   > **Answer:** The core is triangle, circle, circle (3 shapes). 17 ÷ 3 leaves a remainder of 2, so the 17th shape is the 2nd shape of the core: circle.

2. Look at 5, 9, 13, 17, 21, 25. Is it repeating, growing or shrinking? Is it linear?

   > **Answer:** Growing and linear: it goes up by 4 each time.

3. Look at 2, 4, 8, 16, 32. Is it growing or shrinking? Is it linear?

   > **Answer:** Growing but not linear: the changes (2, 4, 8, 16) are not all the same.

4. Look at 50, 44, 38, 32, 26, 20. Is it repeating, growing or shrinking? Is it linear?

   > **Answer:** Shrinking and linear: it goes down by 6 each time.

5. The picture shows figures 1 to 4 of a pattern. How many squares will Figure 6 have?



Figure 1 Figure 2 Figure 3 Figure 4

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> **Answer:** 14 squares
> Figures have 4, 6, 8, 10 squares, so it grows by 2 each time.

6. A plant is 4 cm tall and grows 3 cm every week (made-up numbers). How tall is it after 6 weeks?

> **Answer:** 22 cm
> $4 + 3 \times 6$

7. A water tank holds 120 L and uses 8 L each day (made-up numbers). How many litres are left after 9 days?

> **Answer:** 48 L
> $120 - 8 \times 9$

8. Sam says 3, 7, 12, 18 is a linear growing pattern. Is he right? Explain.

> **Answer:** No. The changes are 4, 5, 6. They are not all the same, so it is growing but not linear.

Student worksheet: Worksheet 1: Repeating, growing and shrinking

Success criteria

- I can name a pattern as repeating, growing or shrinking.
- I can find the core of a repeating pattern.
- I can tell whether a growing pattern is linear by checking the change from term to term.

Show your work. Use the word linear only when the change is the same each time.

1. The pattern is: triangle, circle, circle, triangle, circle, circle, and so on. What is the 17th shape?

2. Look at 5, 9, 13, 17, 21, 25. Is it repeating, growing or shrinking? Is it linear?

3. Look at 2, 4, 8, 16, 32. Is it growing or shrinking? Is it linear?

4. Look at 50, 44, 38, 32, 26, 20. Is it repeating, growing or shrinking? Is it linear?

5. The picture shows figures 1 to 4 of a pattern. How many squares will Figure 6 have?

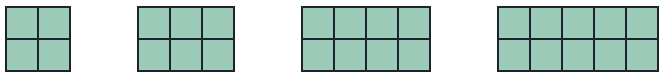


Figure 1 Figure 2 Figure 3 Figure 4

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