

MATHS MISSION

Growing Patterns

🎯 YOUR ROLE: PATTERN TRACKER

📅 Your Mission

A pattern is growing bigger, one step at a time. Your job as Pattern Tracker: find the part that never changes, find the part that grows, and use that to build a rule.

Once you have the rule, you can predict what the pattern will look like on a day you haven't even drawn yet.

🧠 Before You Begin

- Can you think of something that grows by the same amount each time — in a game, in nature, at school, in your family?
- What stays exactly the same, even while it grows?

💡 *Talk with a partner about a growing pattern you've noticed.*

📖 Background

Growing patterns are everywhere — in shells, waves, plants, and family trees. Spotting the part that repeats and the part that grows is one of the oldest kinds of mathematical thinking there is.

🌀 Step 1 - Watch It Grow

Here is a pattern with 4 arms, growing from Day 0 to Day 4. Each arm gets 1 dot longer every day.

What does this pattern remind you of? There's no wrong answer.

This pattern reminds me of...: _____

Day 0
 $1 + 0 = 1$



Day 1
 $1 + 4 = 5$



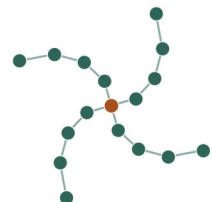
Day 2
 $1 + 8 = 9$



Day 3
 $1 + 12 = 13$



Day 4
 $1 + 16 = 17$



stays the same (constant)



grows every day (4 arms)

🔍 Step 2 - What Stays the Same? What Grows?

Look at the orange dot and the teal dots in every picture.

How many orange dots are there, every single day?: _____

How long is each arm on Day 3?: _____

How many new teal dots are added each day, across all 4 arms?: _____

✏️ Step 3 - Build the Table

Day 0 and Day 1 are done for you. Use the picture to fill in the rest.

Day	Constant	Growing	Total
0	1	0	1
1	1	4	5

Day	Constant	Growing	Total
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____

Step 4 - Find the Rule

Let 'd' stand for the day number, and 'S' stand for the total size of the pattern.

The growing part is always $4 \times d$. The constant part is always 1.

My rule: $S = \text{_____} \times d + \text{_____}$

Make a Decision

The pattern is going on a display board that only fits 50 dots. By Day 10, will it still fit?

- ☐ Yes, it fits
- ☐ No, it's too big

Use your rule to work out the total on Day 10, then explain your decision.

: _____

: _____

Mission Challenge

Here's a new rule: $S = 3 \times d + 2$.

Draw your own growing pattern that matches this rule — it can be anything you like (dots, shapes, arms, rows) as long as it starts at 2 on Day 0 and grows by 3 more each day. Show Day 0 to Day 3 at least.

Draw your growing pattern here (Day 0 to Day 3 or more)

Now use the rule to fill out the table for your pattern.

Day	Constant	Growing	Total
0	2	0	2
1	2	3	5
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____

How was drawing a pattern to fit a rule different from finding a rule for a pattern you were shown, like in Step 4?

: _____

: _____

★ Extension Challenge

Think about your own life. Is there something that grows by the same amount each time, with something that always stays the same?

It could be anything — rounds in a game, rows in a design, people in a photo each year, waves on a beach.

Draw your own growing pattern in the box below. Show Day 0 to Day 3 at least.

Draw your growing pattern here (Day 0 to Day 3 or more)

Describe your own growing pattern in words.

💡 *Talk with a partner about your pattern before you write it down.*

My idea: _____

My rule: $S = \text{ } \times d + \text{ }$

: _____

🌐 Community Connection

Growing and repeating patterns show up on Country and in culture too — in shells, waves, weaving, and art.

- A pattern in nature
- A pattern in art or design
- A pattern in a story passed down in your family

Where have you seen a pattern like this before?

: _____

💬 Reflection

Circle how you felt about today's mission:

😊 Confident 😊 Mostly understood 😊 Needed some help 😊 Found it difficult

What was the hidden rule inside your own pattern, and how did you find it?

: _____

★ Bonus Challenge

Teach your rule to a partner in your own words. What's one tip you'd give them for finding a rule?

: _____

: _____