

# Number Patterns

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## Overview

This activity uses sequences of numbers, called number patterns, to provide practice with basic operations.

It also provides an opportunity for you to assess the existing number skills and knowledge of your students.

Number patterns can be used with a range of students as they can be made easy or quite challenging.

## Skills and Knowledge

- Pattern recognition
- Counting in 2's, 5's, 10's
- Addition and subtraction of whole numbers and money

## Preparation and Materials

Copy Practice Sheets 1 – 5 (one for each student).

It is likely that you will use these over a few numeracy sessions rather than all at once.

## Suggested Procedure

### Introducing the activity

Write a set of numbers on the board: 2, 4, 6, 8 ...

Ask:

- *What comes next?*

Write the next few numbers on the board.

Ask:

- *Do you ever count like this?*
- *Have you heard other people doing it? Why?*
- *Can you think of other common ways that we hear people counting?*
- *What about with money?*
- *If you had a jar full of 10 cent coins how would you count it?*

As you get suggestions write the pattern sequences on the board.

For example for ten cent coins: 10, 20, 30 ....

Ask:

- *What about 5 cent coins?*
- *Or 20 cent coins?*



## What's the rule?

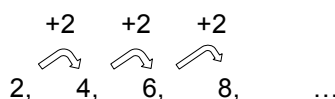
When you have a few of the patterns on the board, Ask:

- *What are we doing to these numbers each time?*
- *Are we adding? Subtracting? Multiplying? Dividing?*

Explain:

- *On the first number pattern we are adding 2*
- *So our 'rule' is to add 2, or + 2*

One way to remember this it to make an arrow between each number and write +2 over it:



*These arrows can be very useful later for exploring opposite operations. For example if we go to the left instead, we would write -2.*

Try some examples that begin mid-sequence, e.g. 12, 15, 18 ...

Fill in the arrows and extend the pattern.

Ask:

- *Can you make a few patterns like this yourself?*

Let students experiment for a minute and give you some of their examples to work through on the board. Ask other students what the next number will be.

## Other practice

*Practice Sheet 1* provides further examples that focus on addition patterns and could be done now, or after the *Guess my rule* game below.

## Guess my rule – A game for pairs

Give a starting number to each student. (You could just whisper a number or have different numbers on pieces of paper to give out.)

Explain:

- *Write down the number I gave you and use it to start your own number pattern*
- *Don't tell anyone else your rule*
- *When you have four numbers in your pattern give it to your neighbour*
- *See if they can work out your rule and put in the next three numbers*

## Patterns with subtraction

Explain:

- *So far we have only looked at patterns with rules that use adding*
- *Now we will look at some that are a bit different*



Work through a couple of examples together on the board. For example:

40	39	38	—	—	—
10	8	6	—	—	—

[Answers: (-1) 37, 36, 35  
(-2) 4, 2, 0 ]

### Adding and subtracting as opposites

Number patterns can be used to show that addition and subtraction are opposite processes, which is very useful for checking subtraction calculations. A powerful way to make this clear is by showing arrows going in both directions on the pattern, as explained below.

Add a dash at the beginning of the second pattern:

—	10	8	6	4	2	0
---	----	---	---	---	---	---



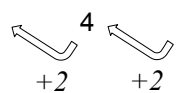
Ask: *Do you know what number would go here?*

Help students to visualise the opposite pattern by suggesting they start at the other end (0, 2, 4, 6, etc.).

Ask: *What would the rule be going this way?*

Draw arrows under the numbers to assist students to see that the next number will be 12:

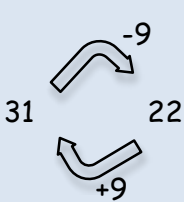
—	10	8	6	4	2	0
---	----	---	---	---	---	---



*This idea can be used later to encourage students to check their subtractions by adding.*

For example 31 - 9

31



*If a student's answer was 23, the check (23 + 9 = 32) should highlight a mistake.*



## Further practice

Practice Sheets 2 & 3 contain a mix of addition and subtraction examples.

Practice Sheets 4 & 5 contain examples of number patterns using money and time.

Students should be allowed to work through these at their own pace. Those who finish quickly can be given later sheets to work on.

You can also generate a wide range of number patterns of your own to suit the level of your students as a group or individually.

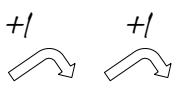
One or two number patterns on the board is a good way to start off a numeracy session.



# Number Patterns

## Practice Sheet 1

- Fill in the missing numbers
- Show the rule you used with an arrow

$+/$   $+/$   


1.     **1**    **2**    **3**    **4**    \_\_\_    \_\_\_    **7**    **8**    \_\_\_    \_\_\_

2.     **2**    **4**    **6**    **8**    **10**    \_\_\_    \_\_\_    \_\_\_    \_\_\_    **20**

3.     **5**    **10**    **15**    **20**    **25**    \_\_\_    \_\_\_    \_\_\_    \_\_\_    **50**    \_\_\_

4.     **10**    **20**    **30**    \_\_\_    \_\_\_    \_\_\_    \_\_\_    \_\_\_    \_\_\_    **100**    \_\_\_

5.     **20**    **40**    **60**    **80**    **100**    \_\_\_    \_\_\_    \_\_\_    \_\_\_    \_\_\_    \_\_\_

6.     \_\_\_    **25**    **35**    **45**    **55**    \_\_\_    \_\_\_    \_\_\_    \_\_\_    \_\_\_

7.     \_\_\_    \_\_\_    \_\_\_    **34**    **44**    **54**    **64**    **74**    \_\_\_    \_\_\_

8.     \_\_\_    **50**    **100**    **150**    \_\_\_    \_\_\_    \_\_\_    \_\_\_    \_\_\_    \_\_\_



- Fill in the missing numbers
- Show the rule you used with an arrow

1.     **1**    **3**    **5**    **7**    \_\_\_   \_\_\_   \_\_\_   \_\_\_   \_\_\_

2.     \_\_\_    **4**    **8**    **12**   **16**   \_\_\_   \_\_\_   \_\_\_   \_\_\_   \_\_\_

3.     \_\_\_    **6**    **9**    **12**   **15**   \_\_\_   \_\_\_   \_\_\_   \_\_\_   \_\_\_

4.     \_\_\_    **22**   **20**   **18**   \_\_\_   \_\_\_   \_\_\_   \_\_\_

5.     \_\_\_    **18**   **27**   **36**   \_\_\_   \_\_\_   \_\_\_   \_\_\_

6.     \_\_\_    **28**   **24**   **20**   \_\_\_   \_\_\_   \_\_\_   \_\_\_

7.     \_\_\_    **30**   **38**   **46**   \_\_\_   \_\_\_   \_\_\_   \_\_\_

8.     **100**   **90**    **80**    \_\_\_   \_\_\_   \_\_\_   \_\_\_   \_\_\_   \_\_\_   \_\_\_



- Fill in the missing numbers
- Show the rule you used with an arrow

1.     **1000**   **2000**   **3000**   \_\_\_   \_\_\_   \_\_\_

2.     **25**     **50**     **75**     \_\_\_   \_\_\_   \_\_\_

3.     \_\_\_     **40**     **37**     **34**     \_\_\_   \_\_\_

4.     \_\_\_     **11**     **22**     **33**     \_\_\_   \_\_\_

5.     \_\_\_     **800**   **600**   **400**   \_\_\_   \_\_\_

6.     \_\_\_     **29**     **27**     **25**     \_\_\_   \_\_\_

7.     \_\_\_     **17**     **25**     **33**     \_\_\_   \_\_\_

8.     **15**     **30**     **45**     \_\_\_   \_\_\_   \_\_\_



# Number Patterns

## Practice Sheet 4

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- Fill in the missing numbers
- Show the rule you used with an arrow

1.     **20c**   **40c**   **60c**   **80c**   **\$1.00**   \_\_\_   \_\_\_   \_\_\_   \_\_\_
  
2.     **50c**   **\$1.00**   **\$1.50**   **\$2.00**   \_\_\_   \_\_\_   \_\_\_   \_\_\_
  
3.     **10c**   **20c**   **30c**   **40c**   **50c**   \_\_\_   \_\_\_   \_\_\_   \_\_\_   \_\_\_   \_\_\_
  
4.     **\$1.00**   **\$1.05**   **\$1.10**   **\$1.15**   \_\_\_   \_\_\_   \_\_\_   \_\_\_
  
5.     **\$40**    **\$60**    **\$80**    \_\_\_   \_\_\_   \_\_\_   \_\_\_
  
6.     **5c**    **10c**   **15c**   \_\_\_   \_\_\_   \_\_\_   \_\_\_
  
7.     **\$1.00**   **\$1.20**   **\$1.40**   **\$1.60**   \_\_\_   \_\_\_   \_\_\_   \_\_\_
  
8.     **\$2.00**   **\$2.05**   **\$2.10**   **\$2.15**   \_\_\_   \_\_\_   \_\_\_   \_\_\_





- Fill in the missing numbers
- Show the rule you used with an arrow

1.    **4 mins**    **6 mins**    **8 mins**    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

2.    **10 sec**    **15 sec**    **20 sec**    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

3.    **30 mins**    **1 hr**    **1 ½ hr**    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

4.    **1.45**    **1.50**    **1.55**    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

5.    **2 o'clock**    **5 past 2**    **10 past 2**    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

6.    **6.15**    **6.30**    **6.45**    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

7.    **45 mins**    **50 mins**    **55 mins**    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

8.    **10 to 9**    **5 to 9**    **9 o'clock**    \_\_\_\_\_    \_\_\_\_\_    \_\_\_\_\_

