



These resources are proudly supported by Toyota Community Trust, Australian Mathematical Sciences Institute, Australian Centre for Career Education, Aurecon Group, and Champion Data.

How to Use These Resources

The following lesson plans are supported by additional resources including:

- Student activity sheet PDFs. These can be completed digitally or printed.
- Supporting PowerPoint presentation including relevant videos.
- [AMSI 2024 Teacher Professional Learning in Industry Day recordings](#). Hear from industry professionals and recent graduates and discover where mathematics can take you.

The lesson plans contain multiple activities that can be used to structure a class or series of classes. The activities can also be used separately to support your own lesson content, or assigned as homework.

Year 8 Lesson Plans

Learning Intention:

- To explore the practical applications of mathematics in various careers.
- To understand the relevance of mathematical concepts in real-world scenarios.
- To inspire students to consider potential career paths that involve mathematics.
- To use mathematical modelling to solve practical problems involving rational numbers.
- To graph linear relations on the Cartesian plane.

Success Criteria:

- Students can identify and describe careers that use mathematical skills.
- Students can apply mathematical concepts to solve real-world problems related to specific careers.
- Students can use mathematical modelling to solve applied problems involving linear relations.
- Students can effectively communicate their problem-solving processes and solutions.

<p>Australian Curriculum Links:</p>	<p><u>AC9M8A02</u> Graph linear relations on the Cartesian plane using digital tools where appropriate; solve linear equations and one-variable inequalities using graphical and algebraic techniques; verify solutions by substitution.</p> <p><u>AC9M8A03</u> Use mathematical modelling to solve applied problems involving linear relations, including financial contexts.</p> <p><u>AC9M8A04</u> Experiment with linear functions and relations using digital tools, making and testing conjectures and generalising emerging patterns.</p> <p><u>AC9M8N05</u> Use mathematical modelling to solve practical problems involving rational numbers and percentages, including financial contexts; formulate problems, choosing efficient calculation strategies and using digital tools where appropriate; interpret and communicate solutions in terms of the situation, reviewing the appropriateness of the model.</p>
<p>Australian Blueprint for Career Development:</p>	<p><u>Phase: 3 – Starting Out</u> Learning Area B: Learning and Work Exploration.</p> <ul style="list-style-type: none"> • Participate in lifelong learning supportive of career goals. • Locate and use career information effectively. • Understand the relationship between work, society and the economy. • Understand the changing nature of life and work roles.
<p>Prior Knowledge/ Concepts/ Skills:</p>	<ul style="list-style-type: none"> • Basic understanding of ratios, percentages, and linear equations. • Familiarity with simple problem-solving strategies.
<p>Equipment/ Resources required:</p>	<ul style="list-style-type: none"> • Whiteboard and markers. • Worksheets or handouts.

**Equipment/
Resources
required:**

- Textbook chapter on algebraic equations and linear graphs. schools.amsi.org.au/ice-em-mathematics-textbooks/
- Access to internet and computers/tablets.
- Topsy Turvy Twins Problem – nzmaths.co.nz/resource/topsy-turvy-twins
- CHOOSEMATHS Video: Dancing with Maths – youtu.be/WUGFGl0CsNU
- CHOOSEMATHS Video: Dreaming Up Robots with Maths – youtu.be/_4MxBbjvrjo

Note: These videos are included in the Year 8 PowerPoint presentation.

Useful Links:

- Myfuture – myfuture.edu.au
- Your Career Occupations – yourcareer.gov.au/occupations
Skills – yourcareer.gov.au/skillscourseseeker.edu.au
- AMSI career videos – careers.amsi.org.au/all-videos/
- Visual Patterns – visualpatterns.org

**Lesson
Description:**

Introduction (10 minutes):

- Begin the lesson by discussing with students the importance of mathematics in everyday life.
- Introduce the concept of careers that involve mathematics. Brainstorm different careers with the class.
- Highlight the fact that mathematics is a fundamental skill in various professions, such as engineering, finance, medicine, and technology.

Activity 1.

- Show the video **CHOOSEMATHS: Dancing with Maths** youtu.be/WUGFGl0CsNU
 - **Note: This video is included in the Year 8 PowerPoint presentation.**
- Discuss the kinds of problems Karin from BHP might solve. e.g. “When will this mine be profitable if we started with a \$20 million fund and it costs \$200K per day to run it, and we sell \$250K of iron ore per day?”

Lesson Description:

- Pose a simplified small group problem: Tia and Tom are twins. Tia saves and Tom spends. Tom finds a \$20 note on Sunday evening and spends \$2 a day starting on Monday. Coincidentally, Tia starts work on Monday and gets \$2.50 a day. How long will it be before Tia has more money than Tom? (Source: NZ Maths nzmaths.co.nz/resource/topsy-turvy-twins).
- Groups work together to solve the problem.
- Relate the problem to Karin's job. How is it similar? How is it different?

Activity 2.

1. Divide the class into small groups, assigning each a specific career path (e.g. architect, accountant, statistician, game developer). Use AMSI career videos to support the discussion.
2. Provide each group with a scenario or problem related to their assigned career requiring mathematical solutions. See appendix for sample problems.
3. Circulate among groups to provide guidance and support. See appendix for scaffolding.
4. Encourage students to discuss the practical applications of the mathematical concepts in their assigned careers.

Activity 3 – Growing patterns.

Background/Description:

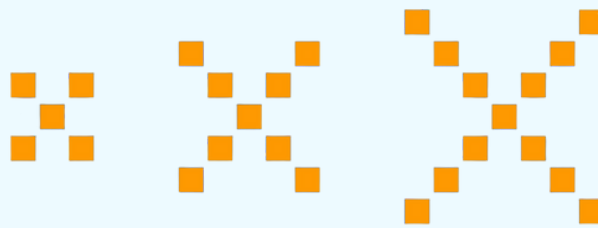
Patterns can be represented in 5 ways, and the number of ways you choose will depend on the year level or development of the student. We will examine the representation of patterns in the following ways:

1. As a diagram.
2. In a verbal description.
3. As a chart.
4. As an algebraic formula.
5. In graphical form.

**Lesson
Description:**

Representing Patterns.

Students are presented with the following pattern:



From visualpatterns.org

Note: This diagram is included in the Year 8 PowerPoint presentation and the Year 8 worksheet.

Ask the following questions:

1. How do you see the pattern growing? Explain this verbally and using a diagram.
2. What is the next figure in the pattern? How many blocks does it contain?
3. What is the 10th item in the pattern and how many blocks does it contain?
4. Draw a table (chart) like the one below and complete it.

Figure no. (f)	1	2	3	4	5	6	7	8
No. of Blocks (b)	5	9	13	17				

5. How would you go about predicting the number of blocks in the hundredth figure? The 250th? The nth? (Now we're starting to go into algebra! Using letters to represent numbers.)
6. Use your chart and predictions to draw a graph. Figure no. (f) should be on the horizontal (x) axis and the No of Blocks (b) should be on the vertical axis.
7. How can you use your graph to make predictions?
8. Try some other patterns. What do you notice about the patterns that make straight lines? Can you find shortcuts to work out the formula? What sorts of shapes can the graphs make? Can we always make predictions?

<p>Lesson Description:</p>	<p>9. What careers would use this mathematics? (<i>The answer is any career that involves prediction.</i>)</p> <p>e.g.</p> <ul style="list-style-type: none"> • Climate scientist. • Futures analyst. • Any sort of analyst. • Finance. • Commerce. • Marketing. • Event management/planning.
<p>Further Information:</p>	<ul style="list-style-type: none"> • The site visualpatterns.org has nearly 400 different patterns. Not all are linear, meaning their graphs may not produce straight lines, but they make great challenges. • Explore mathematical modelling further by examining financial contexts, such as profitability scenarios, and solving real-world problems involving linear relations. <p>At the end of EACH lesson:</p> <ol style="list-style-type: none"> 1. Reconvene as a whole class and have each group present their solutions and findings. 2. Facilitate a discussion on different careers and the mathematical skills required for each. 3. Encourage students to reflect on their interests and strengths in mathematics and potential career applications. 4. Provide additional information on educational pathways and opportunities for pursuing math-related careers. (Option: Design a poster/flyer.)
<p>Appendix:</p>	<ul style="list-style-type: none"> • Statistician video - careers.amsi.org.au/sports-statistician/ • Olympic records - rich.maths.org/records • Mean, median, mode, range - rich.maths.org/10995 • Compare Olympic performances - rich.maths.org/whosthebest • More ideas - htnrich.maths.org/8761