



# Mathematical Reasoning Lesson Plan

## **Week 1: Introduction and Number Sense**

**Focus:** Understanding numbers, place value, and basic arithmetic.

- **Class Overview:**
  - Introduction to the NSW Selective Math test format and expectations.
  - Revisiting basic arithmetic operations (addition, subtraction, multiplication, division).
  - Understanding place value, large numbers, and decimals.
- **Activities:**
  - Practice on mixed arithmetic problems.
  - Class discussion on solving operations with large numbers.
- **Homework:**
  - Arithmetic exercises with focus on place value and decimals.

## **Week 2: Factors, Multiples, and Prime Numbers**

**Focus:** Working with factors, multiples, prime numbers, and divisibility rules.

- **Class Overview:**
  - Prime numbers and composite numbers.
  - Divisibility rules for numbers 2 to 12.
  - Introduction to factors, multiples, and prime factorization.
- **Activities:**
  - Practice on identifying factors, multiples, and primes.
  - Class discussion on divisibility and finding common multiples.
- **Homework:**
  - Practice problems on factors, multiples, and prime numbers.



### **Week 3: Fractions and Decimals**

**Focus:** Converting between fractions, decimals, and percentages; basic operations with fractions.

- **Class Overview:**
  - Converting fractions to decimals and percentages.
  - Adding, subtracting, multiplying, and dividing fractions.
- **Activities:**
  - Exercises on operations with fractions and decimal conversions.
  - Class discussion on fraction-to-decimal strategies.
- **Homework:**
  - Practice fraction and decimal conversion problems.

### **Week 4: Percentages**

**Focus:** Understanding percentages and their application in problem-solving.

- **Class Overview:**
  - What are percentages, and how do they relate to fractions and decimals?
  - Calculating percentages of quantities.
- **Activities:**
  - Practice on calculating percentages in real-world problems (e.g., discounts, increases).
  - Class exercises on converting between fractions, decimals, and percentages.
- **Homework:**
  - Percentage calculation exercises.



## **Week 5: Measurement – Length, Area, and Perimeter**

**Focus:** Understanding units of measurement, calculating perimeter and area.

- **Class Overview:**
  - Review of metric units (length, area, perimeter).
  - How to calculate the perimeter and area of regular shapes (square, rectangle, triangle).
- **Activities:**
  - Exercises on perimeter and area calculations.
  - Class discussion on converting between units (mm, cm, m).
- **Homework:**
  - Perimeter and area practice problems.

## **Week 6: Measurement – Volume and Capacity**

**Focus:** Understanding volume and capacity in practical applications.

- **Class Overview:**
  - Introduction to volume and capacity.
  - Calculating volume for cubes, rectangular prisms, and cylinders.
- **Activities:**
  - Exercises on volume calculations and unit conversions.
  - Group discussion on applying volume in real-world problems.
- **Homework:**
  - Volume and capacity problems with unit conversions.



## **Week 7: Time and Timetables**

**Focus:** Solving problems involving time, timetables, and time zones.

- **Class Overview:**
  - Reading and interpreting timetables and schedules.
  - Solving problems involving elapsed time and time conversions (hours, minutes, seconds).
- **Activities:**
  - Exercises on calculating elapsed time and reading timetables.
  - Group discussion on time zones and international time differences.
- **Homework:**
  - Practice problems involving time calculations.

## **Week 8: Algebra – Introduction to Variables and Simple Equations**

**Focus:** Basic introduction to algebra, working with variables and solving simple equations.

- **Class Overview:**
  - Introduction to variables and algebraic expressions.
  - Solving simple one-step and two-step equations.
- **Activities:**
  - Practice solving basic algebraic equations.
  - Class discussion on how to approach word problems with algebra.
- **Homework:**
  - Simple equation practice problems.



## **Week 9: Geometry – Angles and Properties of Shapes**

**Focus:** Understanding angles, properties of shapes, and basic geometry.

- **Class Overview:**
  - Types of angles (acute, obtuse, right, straight).
  - Properties of triangles, quadrilaterals, and other polygons.
- **Activities:**
  - Practice identifying angles and calculating missing angles in shapes.
  - Group exercises on classifying triangles and polygons based on properties.
- **Homework:**
  - Geometry exercises focused on angles and shapes.

## **Week 10: Geometry – Symmetry, Reflection, and Rotation**

**Focus:** Exploring symmetry, reflection, and rotation in geometric shapes.

- **Class Overview:**
  - Introduction to symmetry (line and rotational).
  - Understanding reflections and rotations of shapes.
- **Activities:**
  - Practice on identifying lines of symmetry and performing reflections.
  - Group discussion on rotational symmetry.
- **Homework:**
  - Symmetry and transformation practice problems.



## **Week 11: Probability and Chance**

**Focus:** Understanding probability, chance, and simple probability calculations.

- **Class Overview:**
  - Introduction to probability concepts (certain, likely, unlikely, impossible).
  - Calculating simple probabilities using fractions and percentages.
- **Activities:**
  - Exercises on calculating the probability of simple events (e.g., rolling dice, drawing cards).
  - Group discussion on real-life examples of probability.
- **Homework:**
  - Probability practice problems.

## **Week 12: Data – Graphs, Charts, and Averages**

**Focus:** Reading and interpreting data in graphs and charts; calculating mean, median, and mode.

- **Class Overview:**
  - Types of graphs (bar, line, pie charts).
  - Understanding averages (mean, median, mode).
- **Activities:**
  - Exercises on reading and interpreting data from various types of charts.
  - Practice calculating mean, median, and mode for small data sets.
- **Homework:**
  - Data interpretation and averages problems.



### **Week 13: Problem Solving – Word Problems**

**Focus:** Solving multi-step word problems using arithmetic, geometry, and algebra.

- **Class Overview:**
  - How to break down complex word problems into manageable steps.
  - Strategies for solving word problems in different areas (e.g., measurement, percentages, algebra).
- **Activities:**
  - Practice solving mixed word problems in pairs or groups.
  - Group discussion on problem-solving strategies.
- **Homework:**
  - Word problem practice problems.

### **Week 14: Problem Solving – Puzzles and Logic Problems**

**Focus:** Solving logic puzzles and developing reasoning skills.

- **Class Overview:**
  - Introduction to logic puzzles (e.g., number puzzles, pattern recognition).
  - Strategies for solving logic problems.
- **Activities:**
  - Class exercises on solving various types of logic puzzles.
  - Group work on solving pattern-based puzzles.
- **Homework:**
  - Logic puzzles and problem-solving exercises.



## **Week 15: Mock Test and Review**

**Focus:** Simulating the actual NSW Selective Math exam through a full-length mock test.

- **Class Overview:**
  - Full-length mock test under timed conditions, covering all areas of the syllabus.
  - Initial feedback on performance and discussion of common errors.
- **Activities:**
  - Timed mock test (2 hours).
  - Class discussion on improving test-taking strategies.
- **Homework:**
  - Review areas of difficulty from the mock test.

## **Week 16: Final Review and Exam Strategies**

**Focus:** Final review of key topics and exam strategies for the NSW Selective Math exam.

- **Class Overview:**
  - Final review of key concepts (fractions, percentages, geometry, algebra).
  - Discussion on exam strategies: Time management, checking work, and handling difficult questions.
- **Activities:**
  - Quick revision of challenging areas.
  - Group discussion on exam strategies and tips for staying calm during the test.
- **Homework:**
  - Final revision and last-minute practice problems.





### **Ongoing Support Throughout the Course:**

- **Weekly Homework Assignments:** Based on each week's class, reinforcing concepts.
- **Regular Feedback:** One-on-one mentoring sessions to address individual weaknesses.
- **Practice Tests:** Additional practice tests with feedback to prepare for the final exam.