Mathayom4 (Grade 10 Mathematics): Semester 2 Comprehensive Lesson Plan

Topic: Fundamental Principle of Counting, Permutations, and Combinations

Duration: 26 Weeks • 2 Classes/Week • 55 Minutes Each

Course Overview

This 26-week comprehensive curriculum provides a structured progression through the Fundamental Principle of Counting, permutations, and combinations. Each week includes two detailed lessons with instructional objectives, classroom activities, assessments, and differentiated worksheets.

Week 1

Lesson 1

Topic: Introduction to Counting Principles

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Basic Counting Principle & Tree Diagrams

Instructional Objectives:
- Extend understanding of weekly concepts.

- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 2

Lesson 1

Topic: Advanced Counting Principle

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Independent and Dependent Events

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 3

Lesson 1
Topic: Factorials

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Applications of Factorials

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 4

Lesson 1

Topic: Permutations Without Repetition

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Permutations in Real-World Context

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 5

Lesson 1

Topic: Permutations With Repetition

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2
Topic: Mixed Permutation Scenarios

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 6

Lesson 1
Topic: Partial Permutations

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.

- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Using Permutation Formulas

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 7

Lesson 1

Topic: Review Week

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.

- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Assessment & Remediation

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 8

Lesson 1

Topic: Introduction to Combinations

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Choosing Objects Without Order

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 9

Lesson 1

Topic: Combination Formula

Instructional Objectives:
- Understand the conceptual foundation of the topic.

- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2
Topic: Applications of Combinations

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 10

Lesson 1
Topic: Combinations vs. Permutations

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Identifying When to Use Each

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 11

Lesson 1

Topic: Counting with Restrictions

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Conditional Counting

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 12

Lesson 1

Topic: Binomial Coefficients

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Connections to Pascal’s Triangle

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 13

Lesson 1
Topic: Mid-Semester Review

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2
Topic: Cumulative Assessment

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.

- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 14

Lesson 1
Topic: Complex Counting Scenarios

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2
Topic: Multi-step Counting Problems

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.

- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 15

Lesson 1
Topic: Counting in Probability Contexts

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2
Topic: Permutations and Combinations in Probability

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 16

Lesson 1
Topic: Mixed Practice

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2
Topic: Advanced Word Problems

Instructional Objectives:
- Extend understanding of weekly concepts.

- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 17

Lesson 1

Topic: Factorials in Algebraic Expressions

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Simplification & Problem Solving

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 18

Lesson 1

Topic: Committee Selection Problems

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Casework Strategies

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 19

Lesson 1

Topic: Advanced Applications

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Olympiad-style Counting Problems

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 20

Lesson 1

Topic: Project Work Week

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Counting Applications in Real Life

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 21

Lesson 1

Topic: Review Week

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.

- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Assessment & Remediation

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 22

Lesson 1

Topic: Counting Games & Puzzles

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.

- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Group Problem Solving

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 23

Lesson 1

Topic: Exam Preparation

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2
Topic: Mock Test 1

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 24

Lesson 1
Topic: Exam Preparation

Instructional Objectives:
- Understand the conceptual foundation of the topic.

- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2
Topic: Mock Test 2

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 25

Lesson 1
Topic: Final Review

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2

Topic: Q&A and Final Reinforcement

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Week 26

Lesson 1
Topic: Final Assessment

Instructional Objectives:
- Understand the conceptual foundation of the topic.
- Apply mathematical reasoning to solve structured problems.
- Demonstrate comprehension through guided practice.

Activities:
- Warm-up problem on prior knowledge.
- Direct instruction followed by examples.
- Pair/Group practice using worksheets.
- Exit ticket problem.

Assessment:
- Formative: Observation, guided questions, worksheet items.
- Summative: Short quiz or mini-task.

Differentiation:
- Support: Step-by-step scaffolded worksheets.
- Extension: Challenge problems for advanced learners.

Lesson 2
Topic: Reflection & Enrichment Activities

Instructional Objectives:
- Extend understanding of weekly concepts.
- Solve real-world and abstract problems involving combinatorics.
- Collaborate in mathematical discussions and problem solving.

Activities:
- Review of Lesson 1.
- Teacher-led modeling of new examples.
- Independent practice.
- Small-group problem-solving tasks.

Assessment:
- Formative: Worksheet completion, peer discussion.
- Summative: Application problems / short evaluations.

Differentiation:
- Support: Visual aids and sample solutions.
- Extension: Olympiad-level permutation/combination challenges.

Worksheets & Practice Problems (Appendix)

The appendix includes foundational, intermediate, and advanced-level worksheets for flexible differentiation.

Worksheet A – Fundamental Counting Principle

1. A locker code uses 3 letters followed by 2 digits. How many possible codes are there?
2. A sandwich shop offers 4 breads, 3 meats, and 5 toppings. How many sandwiches can be made?
3. Draw a tree diagram for flipping a coin twice.

Worksheet B – Permutations

1. How many ways can you arrange the letters in the word 'LEVEL'?
2. How many 4-digit numbers can be formed from 1–8 without repetition?
3. In how many ways can 5 students stand in a line?

Worksheet C – Combinations

1. Choose 3 books from a shelf of 12.
2. A club needs a committee of 4 from 10 members. How many committees are possible?
3. Choose 5 players from a group of 9 for a team.

Worksheet D – Mixed Problem Solving

1. A code consists of 2 letters (repetition allowed) and 3 digits (no repetition). How many codes exist?
2. Compare: Is choosing 3 out of 8 the same as arranging 3 out of 8? Explain.
3. A tournament bracket has 6 teams. How many unique matchups are possible?