NNF BOOKS

ESSENTIAL CODING

Basic 5

Facilitator's Guide

NaCCA APPROVED

Essential Coding

Basic 5

Facilitator's Guide

NNF Esquire Limited
P.O. Box AN 8644
Accra – North
Ghana.

Telephone or WhatsApp
+233 26 211 3117
+233 24 460 8305

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If you want to know more about this book or any other NNF Esquire Limited publication, phone us at +233 26 211 3117, +233 24 460 8305 or send an e-mail to nnfstareducation@gmail.com/info@nnfesquire.com.

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Introduction

Overview of the Essential Coding Series and Facilitator's Guide

The books in the ***Essential Coding*** series introduce young learners to the foundations of computational thinking and early coding skills through engaging visual activities and problem-solving tasks. These activities encourage learners to observe carefully, think logically, recognise patterns, and solve challenges step by step.

The content is organised into four progressive levels that gradually develop learners' thinking abilities—from basic reasoning to algorithmic thinking. Each level focuses on important skills such as counting, comparison, classification, pattern recognition, logical reasoning, and step-by-step problem solving.

Every activity includes a **"Completed in ____ Min."** section to help teachers manage classroom time effectively and encourage learners to develop focus and time awareness. The book also includes **QR codes** linked to educative videos that support better understanding of concepts through visual learning and guided explanation.

At the end of each level, learners complete a **Coding Challenge** activity to apply the skills learned through observation, reasoning, and logical thinking.

The book also includes a **Progress Report** section to help teachers evaluate learners' development in four key computational thinking areas:

- Reasoning
- Critical Thinking & Analysis
- Data Processing
- Algorithmic Intelligence

Teachers can use this section to record progress, provide feedback, and identify areas where additional support may be needed.

Using This Facilitator's Guide Effectively

This Facilitator's Guide is designed to help teachers conduct lessons in a structured and meaningful manner. Before teaching, teachers are encouraged to read the "Overview Section", "How This Book Teaches Coding Without Computers", and "Structure of Learning Levels" sections to understand the learning approach and progression.

For every concept, teachers should follow the sequence provided in the guide:

- **Diagnostic Assessment:** (includes Diagnostic Check, Remediation Support, and Extension Activities)
- **Facilitator's Page-wise Teaching Instructions:** (includes Teacher Instructions, Teacher–Learner Interaction, Teacher Guidance, Reinforcement, Coding Link, and Review Exercise)
- **Level Completion Components:** (includes Review Exercise, Differentiated Learning, and Teacher Closure)

This structured flow helps teachers introduce concepts clearly, observe learner understanding, provide support where needed, and connect activities with computational thinking and early coding skills.

How This Book Teaches Coding Without Computers

Building Foundations for Coding

- Coding starts with thinking, not typing
- Every activity builds a coding skill
- Learners are developing computational thinking
- These skills prepare learners for real programming

Teaching Philosophy

Coding does not begin with computers. It begins with thinking.

This book develops computational thinking skills, which are the foundation of coding:

- Observation
- Logical reasoning
- Pattern recognition
- Sequencing
- Decision-making

Every activity in this book is intentionally designed to build a coding skill.

What Teachers Must Understand

Coding = Giving clear instructions to solve a problem

Learners are already "coding" when they:

- Count
- Follow steps
- Identify patterns
- Make decisions

Your role is to help learners see the connection.

Coding Link 

Whenever you see this icon, explain to learners how the activity relates to coding.

Teaching Strategy

Every lesson should follow this flow:

- Introduce concept (real-life example)
- Demonstrate activity

- Guide learners step-by-step
- Ask questions
- Reinforce learning
- Explain Coding Link

Classroom Strategy

- Encourage learners to think aloud
- Allow trial and error
- Use real objects when possible
- Keep lessons interactive

Professional Positioning

Teachers should communicate clearly:

"This is not just an activity. This is coding thinking."

Final Note for Teachers

By teaching this book well, you are not just teaching activities.

You are:

- Building problem solvers
- Developing logical thinkers
- Preparing future programmers

Every activity is a step into coding

Inclusive Learning Statement

This Facilitator's Guide promotes inclusive and learner-centred education by encouraging teachers to support learners with diverse learning needs through differentiated instruction, peer collaboration, visual aids, oral participation, hands-on activities, movement-based learning, and flexible assessment strategies. Teachers should ensure that all learners, including learners requiring additional learning support, are actively involved in classroom activities, discussions, problem-solving tasks, and coding-related experiences in a respectful and supportive learning environment.

Structure of Learning Levels

Level 1: Reasoning

This level develops learners' logical reasoning, number sense, and language pattern recognition skills. Through puzzles and number activities, learners practise analysing patterns, combining numbers, and identifying relationships between words and numbers.

1.1 Number Combinations

Learners explore different ways of combining numbers to reach a specific total. These activities strengthen addition skills, logical reasoning, and numerical flexibility.

1.2 Arithmagons

Learners solve number puzzles where the value on each side of a shape is the sum of the numbers at the adjacent vertices. This develops logical thinking and number relationships.

1.3 Graphical Addition

Learners perform addition using visual diagrams and coloured sections, helping them understand numerical relationships through graphical representation.

1.4 Word Hunt

Learners search for hidden words in a grid arranged in different directions. This activity improves observation skills and vocabulary recognition.

1.5 Word Pattern

Learners identify patterns in words based on similar spellings, prefixes, or sounds, helping them recognise patterns in language.

1.6 Rhyming Words

Learners identify words that rhyme with given clues, strengthening language awareness and pattern recognition.

Coding Challenge - 1: Open the Safe

Learners analyse numbers on a safe and select three numbers whose sum equals 100, strengthening logical reasoning and number analysis skills.

Level 2: Critical Thinking & Analysis

This level focuses on improving learners' analytical reasoning, visual comparison skills, and logical decision making.

2.1 Mysterious Pictures

Learners identify objects and use the first letters of pictures to form meaningful words.

2.2 Symmetrical Images

Learners explore symmetry by identifying lines of symmetry and completing mirror images.

2.3 Logical Analysis

Learners solve reasoning problems involving patterns, numbers, and logical relationships.

2.4 Odd One Out

Learners identify the item that does not belong to a group based on patterns, categories, or relationships.

2.5 Wonderful Sudoku

Learners solve Sudoku puzzles by arranging numbers so that each row, column, and grid contains unique numbers.

Coding Challenge - 2: Overlook and Recall

Learners observe a group of pictures and words for a short time and then try to recall them from memory, strengthening observation and memory skills.

Level 3: Data Processing

This level introduces learners to organising, interpreting, and analysing information, which is an important part of computational thinking.

3.1 Ascending and Descending Order

Learners arrange numbers from smallest to largest or largest to smallest, improving number comparison skills.

3.2 Pie Chart

Learners interpret data shown in pie charts and answer questions based on graphical information.

3.3 Binary Code

Learners explore the binary number system used by computers, where information is represented using 0 (off) and 1 (on).

3.4 Data Compression

Learners understand how information can be shortened using abbreviations and compressed formats.

Coding Challenge - 3: Addition Maze

Learners follow a maze by solving addition problems to reach the correct path and find the treasure.

Level 4: Algorithmic Intelligence

This level introduces learners to algorithmic thinking and simple programming concepts, which form the basis of coding.

4.1 Algorithm

Learners understand that an algorithm is a step-by-step set of instructions used to complete a task or solve a problem.

4.2 Programs: Conditions

Learners explore If–Then–Else conditions, which allow computers to make decisions based on specific situations.

4.3 Programs: Loops

Learners learn about loops, where instructions repeat multiple times to complete a task or create patterns.

Coding Challenge - 4: Banana Muffin

Learners arrange the steps of a recipe in the correct sequence to prepare banana muffins, applying algorithmic sequencing and logical ordering.

- Data interpretation and problem solving
- Algorithmic thinking and understanding instructions

Fun with Coding – Scratch

The book introduces learners to Scratch, a beginner-friendly block-based programming language designed for children.

Learners discover how to:

- Create animations and simple games
- Move characters (sprites) on the stage
- Use blocks to create scripts (programs)
- Control movement, actions, and events

Scratch uses visual blocks that fit together like puzzle pieces, making it easy for learners to understand programming logic and develop their creativity in coding projects

Coding Links

Level 1: Reasoning

Concept 1.1: Number Combinations

Activity A: Form Number Combinations (Total = 85)

🔗 **Coding Link:** Computers solve problems by trying different combinations to reach a correct result. When learners combine numbers in different ways to make 85, they are thinking like a computer that checks multiple possibilities to find the correct answer.

Activity B: Form Number Combinations (Total = 200)

🔗 **Coding Link:** In coding, there can be more than one way to solve a problem. When learners find different combinations to make 200, they are learning that computers can use different methods to reach the same result.

Activity C: Complete the Number Sums

🔗 **Coding Link:** Computers break big problems into smaller parts and solve them step by step. When learners choose numbers and add them to reach a total, they are using the same step-by-step thinking used in coding.

Concept 1.2: Arithmagons

Activity A: Solve the Arithmagons

🔗 **Coding Link:** Computers follow rules to solve problems. In this activity, learners use the rule of addition to find missing numbers. This is similar to coding, where computers follow rules to calculate and find correct answers.

Concept 1.3: Graphical Addition

Activity A: Count and Add the Coloured Pieces

🔗 **Coding Link:** Computers understand information using visuals like images and graphics. When learners count coloured parts and add them, they are learning how computers process visual information and convert it into numbers.

Concept 1.4: Word Hunt

Activity A: Search the Words in the Grid

🔗 **Coding Link:** Computers search for information by scanning data carefully. When learners look for hidden words in different directions, they are doing the same kind of searching that computers perform while finding information.

Activity B: Find the Words in the Grid

🔗 **Coding Link:** Computers identify patterns in letters and data. When learners search and recognise words in the grid, they are practising pattern recognition, which is an important skill used in coding.

Concept 1.5: Word Pattern

Activity A: Complete the Word Pattern

🔗 **Coding Link:** Computers recognise patterns to predict what comes next. When learners identify similar word patterns and continue them, they are thinking like a computer that uses patterns to make decisions.

Concept 1.6: Rhyming Words

Activity A: Identify the Rhyming Word

🔗 **Coding Link:** Computers analyse sounds and patterns in language, such as in speech recognition. When learners identify rhyming words, they are recognising sound patterns, just like computers do while processing language.

Coding Challenge - 1: Open the Safe

Activity: Find the Correct Combination

🔗 **Coding Link:** Computers solve problems by testing different combinations until they find the correct one. When learners choose three numbers to make 100, they are using logical thinking similar to how computers solve problems step by step.

Level 2: Critical Thinking & Analysis

Concept 2.1: Mysterious Pictures

Activity A: Form a Word Using the First Letters

🔗 **Coding Link:** Computers read and process information step by step. When learners identify pictures and take their first letters to form a word, they are working like a computer that converts images into meaningful data.

Activity B: Compare the Weight

🔗 **Coding Link:** Computers compare values to make decisions. When learners decide which object is heavier, lighter, or equal, they are using comparison logic similar to how computers analyse and compare data.

Activity C: Colour the Picture Using Mathematical Answers

🔗 **Coding Link:** Computers follow instructions based on calculations. When learners solve sums and colour according to answers, they are connecting numbers with actions, just like a computer program follows instructions based on results.

Concept 2.2: Symmetrical Images

Activity A: Find the Number of Lines of Symmetry

🔗 **Coding Link:** Computers recognise patterns and balance in shapes and images. When learners identify lines of symmetry, they are understanding how computers detect patterns and structure in visual data.

Activity B: Draw the Other Half of the Symmetrical Figure

🔗 **Coding Link:** Computers can create mirror images by copying and reflecting data. When learners draw the other half of a shape, they are doing the same process of reflection used in computer graphics.

Activity C: Complete the Symmetrical Picture

🔗 **Coding Link:** Computers complete images by following patterns and positions. When learners complete a symmetrical picture, they are understanding how computers recreate and complete visual designs.

Concept 2.3: Logical Analysis

Activity A: Count the Squares

🔗 **Coding Link:** Computers analyse details carefully to find all possible results. When learners count all squares, including hidden ones, they are practising detailed analysis like a computer processing all possibilities.

Activity B: Identify the Missing Figure

🔗 **Coding Link:** Computers follow patterns to predict what comes next. When learners identify the missing figure, they are using pattern recognition, which is an important skill in coding.

Activity C: Logical Reasoning Questions

🔗 **Coding Link:** Computers solve problems by analysing information step by step. When learners answer reasoning questions, they are using logical thinking similar to how computers process and solve problems.

Concept 2.4: Odd One Out

Activity A: Identify the Odd Number

Coding Link: Computers group data based on rules and patterns. When learners find the number that does not follow the pattern, they are using classification logic like a computer.

Activity B: Identify the Odd Word

Coding Link: Computers organise information into categories. When learners identify the word that does not belong, they are learning how computers classify and separate data.

Concept 2.5: Wonderful Sudoku

Activity A: Solve the Sudoku with Numbers

Coding Link: Computers solve puzzles by following rules and checking conditions. When learners complete Sudoku using numbers, they are applying rule-based logic similar to how computers solve problems.

Activity B: Solve the Sudoku with Letters

Coding Link: Computers work with both numbers and letters using the same logic. When learners solve Sudoku with letters, they are understanding that coding rules apply to all types of data.

Coding Challenge - 2: Overlook and Recall

Activity: Observe and Recall

Coding Link: Computers store and recall information to complete tasks. When learners observe and remember details, they are developing memory and attention skills similar to how computers store and retrieve data

Level 3: Data Processing

Concept 3.1: Ascending and Descending

Activity A: Arrange the Numbers in Ascending Order

Coding Link: Computers organise data by arranging it in a specific order. When learners arrange numbers from smallest to largest, they are learning sorting, which is how computers organise information.

Activity B: Arrange the Numbers in Descending Order

Coding Link: Computers also arrange data from largest to smallest when needed. When learners arrange numbers in descending order, they are understanding how computers sort and compare data efficiently.

Activity C: Count and Write – 6 More

Coding Link: Computers perform calculations and then organise the results. When learners add 6 to each number and arrange them, they are following steps like a computer that calculates and processes data step by step.

Concept 3.2: Pie Chart

Activity A: Study the Pie Chart and Answer the Questions

Coding Link: Computers present data using charts and graphs to make it easy to understand. When learners read and compare parts of a pie chart, they are learning how computers display and analyse data visually.

Concept 3.3: Binary Code

Activity A: Create Binary Codes for the Images

Coding Link: Computers use binary code (0 and 1) to store and show information. When learners convert coloured boxes into 0s and 1s, they are understanding how computers represent images using binary data.

Activity B: Write Binary Codes for the Given Images

Coding Link: Computers read patterns of 0s and 1s to understand images. When learners write binary codes from pictures, they are learning how computers process and store visual information.

Activity C: Colour the Boxes

Coding Link: Computers follow coded instructions to create images. When learners colour boxes based on 0 and 1, they are following instructions just like a computer program that creates graphics.

Concept 3.4: Data Compression

Activity A: Match the Abbreviations

Coding Link: Computers reduce large information into shorter forms to save space. When learners match abbreviations with their meanings, they are understanding how computers compress data to store it efficiently.

Activity B: Decode the Compressed Story

Coding Link: Computers also expand compressed data to understand it fully. When learners decode a story from symbols and pictures, they are learning how computers convert compressed data back into meaningful information.

Coding Challenge - 3: Addition Maze

Activity: Find the Correct Path in the Maze

Coding Link: Computers solve problems by following the correct path based on calculations. When learners solve sums and choose the right path in the maze, they are using step-by-step logic similar to how computers execute instructions.

Level 4: Algorithmic Intelligence

Concept 4.1: Algorithm

Activity A: Complete the Algorithm

Coding Link: Computers follow step-by-step instructions called algorithms to complete a task. When learners fill in the missing steps, they are understanding how every step is important for a computer to work correctly.

Activity B: Algorithm for Addition and Multiplication

Coding Link: Computers solve problems by following clear steps in order. When learners complete the steps to find sum and product, they are working like a computer that performs calculations step by step.

Activity C: Algorithm to Prepare Tea

Coding Link: Computers can be programmed to perform daily tasks using instructions. When learners arrange steps to prepare tea, they are learning how real-life activities can be written as algorithms in coding.

Concept 4.2: Programs – Conditions

Activity A: Complete the Conditional Program

Coding Link: Computers make decisions using conditions such as 'if–then–else'. When learners complete the program for pass or fail, they are understanding how computers decide actions based on given conditions.

Activity B: Complete the Conditional Statements

Coding Link: "Computers respond differently based on situations. When learners complete 'if–then' statements, they are practising decision-making logic used in coding.

Activity C: Apply Conditions Using Numbers

🔗 **Coding Link:** Computers use rules to perform actions automatically. When learners apply rules like divisible by 2 or 3, they are using conditional logic similar to how computer programs work.

Concept 4.3: Programs – Loops

Activity A: Follow the Given Programs

🔗 **Coding Link:** Computers repeat instructions using loops to save time and effort. When learners follow repeated steps, they are understanding how loops help computers perform tasks again and again.

Activity B: Colour the Stairs Using the Loop

🔗 **Coding Link:** Computers use loops to repeat the same set of actions in a pattern. When learners repeat colouring steps, they are learning how loops create patterns and simplify repeated work in coding.

Coding Challenge - 4: Banana Muffin

Activity: Arrange the Steps to Make Banana Muffins

🔗 **Coding Link:** Computers follow instructions in the correct order to complete tasks successfully. When learners arrange the steps of a recipe, they are practising sequencing, which is an important part of writing a computer program.

Diagnostic Assessment

Concept 1.1: Number Combinations (LB Pages 8–10)

⇨ Activity A: Form Number Combinations (Total = 85)

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Add numbers mentally and using written methods.
- Recognise that different combinations can make the same total.
- Compare number values carefully.
- Identify multiple ways to form a target number.

Observe learners who:

- Cannot identify valid combinations correctly.
- Need repeated support with addition.
- Confuse totals while combining numbers.
- Struggle to think of multiple solutions.

Remediation Support

For learners struggling with combinations:

- Use counters or number cards to demonstrate combinations.
- Start with smaller totals before moving to 85.
- Show combinations step by step.
- Encourage learners to check totals after every combination.

For learners needing additional support:

- Highlight one number group at a time.
- Use colour coding for repeated numbers.
- Allow learners to work with partners during problem solving.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create additional combinations for 85.
- Find combinations using fewer or more numbers.
- Challenge classmates with target-number puzzles.
- Create their own combination game independently.

➪ Activity B: Form Number Combinations (Total = 200)

Diagnostic Check

(Work in Pairs)

Before the activity, ask learners to:

- Recognise number combinations for larger totals.
- Add multiple numbers accurately.
- Compare values logically.
- Identify more than one possible solution.

Observe learners who:

- Cannot form combinations correctly.
- Need repeated addition support.
- Guess combinations without checking totals.
- Struggle with larger numbers.

Remediation Support

For learners struggling with larger totals:

- Break the total into smaller parts.
- Use place-value discussion for larger numbers.
- Show how 100, 50, and 30 combine visually.
- Encourage learners to verify totals step by step.

For learners needing additional support:

- Use guided examples before independent work.
- Practise combinations using smaller totals first.
- Allow learners to discuss ideas with partners.

Extension Activity

(Work Individually / in Groups)

Ask fast learners to:

- Find more than six combinations for 200.
- Create target-number puzzles for classmates.
- Use additional numbers in combinations.
- Explain how different combinations reach the same total.

➪ Activity C: Complete the Number Sums

Diagnostic Check

(Work in Pairs)

Before the activity, ask learners to:

- Add groups of numbers accurately.
- Recognise totals and missing values.
- Use logical reasoning to complete number combinations.

- Compare combinations carefully.

Observe learners who:

- Make errors in addition.
- Need repeated teacher support.
- Cannot identify suitable combinations.
- Struggle to check totals correctly.

Remediation Support

For learners struggling with sums:

- Use counters or beads for addition practice.
- Solve one combination at a time together.
- Encourage learners to add aloud step by step.
- Highlight totals using colour coding.

For learners needing additional support:

- Start with smaller sums first.
- Provide guided examples before independent work.
- Allow learners to use number lines for support.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own target-number combinations.
- Find different solutions for the same total.
- Challenge classmates with addition puzzles.
- Use larger totals independently.

Concept 1.2: Arithmagons (LB Pages 11–12)

➪ Activity A: Solve the Arithmagons

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Add numbers accurately.
- Recognise relationships between side values and corner values.
- Observe number patterns carefully.
- Identify missing values logically.

Observe learners who:

- Cannot apply the addition rule correctly.
- Need repeated teacher support.

- Guess answers without checking.
- Struggle to identify relationships between numbers.

Remediation Support

For learners struggling with arithmagons:

- Explain the rule using simple examples first.
- Show how two adjacent vertices form the side value.
- Solve one side at a time together.
- Encourage learners to check answers using addition.

For learners needing additional support:

- Start with smaller arithmagon puzzles first.
- Use colour coding to connect related numbers.
- Allow learners to use counters for support.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own arithmagon puzzle.
- Use larger numbers independently.
- Challenge classmates with missing-number puzzles.
- Explain how the arithmagon rule works.

Concept 1.3: Graphical Addition (LB Page 13)

⇨ Activity A: Count and Add the Coloured Pieces

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Count coloured sections in circles accurately.
- Recognise fractions or equal parts visually.
- Perform simple addition mentally.
- Compare visual quantities carefully.

Observe learners who:

- Miscount coloured sections.
- Need repeated support while adding totals.
- Confuse coloured and uncoloured sections.
- Struggle to transfer visual information into numbers.

Remediation Support

For learners struggling with graphical addition:

- Count coloured sections together slowly.
- Use counters or pie-cut models for demonstration.
- Show how each coloured part represents one unit.
- Encourage learners to add step by step aloud.

For learners needing additional support:

- Use circles with fewer sections first.
- Highlight coloured sections using markers.
- Allow learners to work with partners.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own graphical addition puzzles.
- Draw circles with different coloured combinations.
- Challenge classmates with visual addition tasks.
- Explain how graphical representations show addition.

Concept 1.4: Word Hunt (LB Pages 14–16)

Activity A: Search the Words in the Grid

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Read words horizontally, vertically, and diagonally.
- Recognise familiar vocabulary words.
- Observe letter grids carefully.
- Scan rows and columns systematically.

Observe learners who:

- Cannot identify hidden words correctly.
- Skip letters while searching.
- Need repeated visual guidance.
- Struggle to search in different directions.

Remediation Support

For learners struggling with word searching:

- Highlight the first letter of target words.
- Use finger tracking while scanning the grid.

- Search one row or column at a time.
- Read target words aloud before searching.

For learners needing additional support:

- Use smaller grids first.
- Provide guided examples before independent work.
- Allow learners to work in pairs.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own word-hunt puzzle.
- Hide words in diagonal directions.
- Challenge classmates with hidden-word activities.
- Explain how they located the words efficiently.

➪ Activity B: Find the Words in the Grid

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Recognise vocabulary words correctly.
- Read words in different directions.
- Observe letter patterns carefully.
- Identify hidden words logically.

Observe learners who:

- Cannot identify hidden words accurately.
- Confuse letter order while searching.
- Need repeated support while scanning the grid.
- Struggle to focus on one word at a time.

Remediation Support

For learners struggling with hidden words:

- Use finger tracing to follow letters.
- Search for one word at a time.
- Highlight beginning letters of target words.
- Encourage learners to read words aloud while searching.

For learners needing additional support:

- Use simplified grids first.
- Provide guided demonstrations.
- Allow learners to solve collaboratively.

Extension Activity

(Work Individually / in Groups)

Ask fast learners to:

- Create advanced word-hunt puzzles.
- Hide classroom vocabulary words in different directions.
- Challenge classmates with word-search competitions.
- Explain search strategies independently.

Concept 1.5: Word Pattern

(LB Pages 17–18)

⇨ Activity A: Complete the Word Pattern

Diagnostic Check

(Work in Pairs)

Before the activity, ask learners to:

- Identify similar spelling patterns in words.
- Recognise common prefixes, suffixes, or sounds.
- Read words aloud carefully.
- Predict additional words following a pattern.

Observe learners who:

- Cannot recognise the spelling pattern.
- Need repeated pronunciation support.
- Struggle to identify similar word endings or beginnings.
- Guess words without checking the pattern.

Remediation Support

For learners struggling with word patterns:

- Highlight common letter groups in words.
- Read words aloud together slowly.
- Use colour coding for repeated sounds or spellings.
- Compare one word pair at a time.

For learners needing additional support:

- Start with simpler word families first.
- Use flashcards showing similar words.
- Encourage learners to say patterns aloud.

Extension Activity

(Work Individually / in Groups)

Ask fast learners to:

- Create their own word-pattern chains.
- Find additional words with similar spellings.

- Write word-family lists independently.
- Challenge classmates with pattern puzzles.

Concept 1.6: Rhyming Words (LB Page 19)

⇨ Activity A: Identify the Rhyming Word

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Listen carefully to ending sounds in words.
- Identify rhyming word pairs.
- Recognise picture clues correctly.
- Read simple rhyming words aloud.

Observe learners who:

- Cannot hear rhyming sounds clearly.
- Confuse picture names.
- Need repeated oral support.
- Struggle to connect rhyming word pairs.

Remediation Support

For learners struggling with rhyming words:

- Repeat rhyming word pairs aloud slowly.
- Use picture-word flashcards for support.
- Highlight matching ending sounds.
- Encourage learners to clap while saying rhyming words.

For learners needing additional support:

- Start with simple rhyming pairs first.
- Use oral rhyme games regularly.
- Allow learners to work with partners.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own rhyming word puzzles.
- Write rhyming sentences or poems.
- Challenge classmates with rhyme games.
- Identify additional rhyming words independently.

Coding Challenge – 1: Open the Safe (LB Page 20)

Activity: Find the Correct Combination

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Add three numbers accurately.
- Recognise combinations that form a target number.
- Compare number values logically.
- Follow puzzle rules carefully.

Observe learners who:

- Cannot identify correct combinations.
- Use the same number repeatedly despite instructions.
- Need repeated support with addition.
- Struggle to test different possibilities logically.

Remediation Support

For learners struggling with combinations:

- Start with simpler target-number puzzles first.
- Use number cards to test combinations physically.
- Add numbers step by step together.
- Encourage learners to verify totals carefully.

For learners struggling with logical reasoning:

- Eliminate impossible combinations first.
- Highlight the rule of using only three numbers.
- Encourage learners to test combinations systematically.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own "open the safe" puzzle.
- Use larger target totals independently.
- Challenge classmates with combination puzzles.
- Explain how they identified the correct combination logically.

Level 2: Critical Thinking & Analysis

Concept 2.1: Mysterious Pictures

(LB Pages 22–24)

➪ Activity A: Form a Word Using the First Letters

Diagnostic Check

(Work in Pairs)

Before the activity, ask learners to:

- Identify pictures and their names correctly.
- Recognise beginning letters of words.
- Combine letters to form meaningful words.
- Read simple words aloud.

Observe learners who:

- Cannot identify picture names correctly.
- Confuse beginning letters.
- Need repeated teacher guidance.
- Struggle to combine letters into words.

Remediation Support

For learners struggling with picture-word association:

- Use flashcards with pictures and labels.
- Say picture names aloud together.
- Highlight the first letter in each word.
- Encourage learners to write one letter at a time.

For learners needing additional support:

- Use simpler word combinations first.
- Provide guided examples before independent work.
- Allow learners to work with partners.

Extension Activity

(Work Individually / in Groups)

Ask fast learners to:

- Create their own picture-letter puzzles.
- Write hidden words using picture clues.
- Challenge classmates with word-formation games.
- Explain how the letters form the final word.

⇨ Activity B: Compare the Weight

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Observe balance scales carefully.
- Compare heavier and lighter objects.
- Recognise equal-weight situations.
- Interpret visual weight relationships logically.

Observe learners who:

- Cannot identify heavier or lighter sides correctly.
- Need repeated support with comparison.
- Confuse equal and unequal weights.
- Struggle to analyse balance-scale pictures.

Remediation Support

For learners struggling with weight comparison:

- Use real balance scales and classroom objects.
- Show how the lower side is heavier.
- Compare one picture at a time.
- Use counters or objects to demonstrate equal weight.

For learners needing additional support:

- Use simple two-object comparisons first.
- Repeat vocabulary such as heavier, lighter, and equal.
- Allow partner discussion before answering.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own balance-scale puzzle.
- Draw heavier and lighter object comparisons.
- Challenge classmates with reasoning questions.
- Explain why one side is heavier or lighter.

⇨ Activity C: Colour the Picture Using Mathematical Answers

Diagnostic Check *(Work Individually)*

Before the activity, ask learners to:

- Solve simple addition and subtraction problems.
- Recognise colours and number codes correctly.
- Follow instructions carefully.
- Match answers with colours logically.

Observe learners who:

- Make calculation errors frequently.
- Forget the colour code.
- Need repeated support while solving sums.
- Struggle to connect answers with colours.

Remediation Support

For learners struggling with calculations:

- Solve one arithmetic problem at a time together.
- Use counters or number lines for support.
- Encourage learners to verify answers carefully.
- Highlight colour-answer matching clearly.

For learners needing additional support:

- Use smaller arithmetic values first.
- Display the colour key clearly on the board.
- Allow learners to work slowly with guidance.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own maths-colouring puzzle.
- Use larger sums and differences independently.
- Challenge classmates with coded colouring activities.
- Explain how calculations determine the colours.

Concept 2.2: Symmetrical Images (LB Pages 25–27)

⇨ Activity A: Find the Number of Lines of Symmetry

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Identify symmetrical shapes.
- Recognise equal halves in shapes.
- Observe mirror-image patterns carefully.
- Visualise folding shapes into equal parts.

Observe learners who:

- Cannot identify symmetry lines correctly.
- Draw incorrect symmetry lines.
- Need repeated visual support.
- Struggle to recognise balanced shapes.

Remediation Support

For learners struggling with symmetry:

- Use folded paper shapes for demonstration.
- Show mirror images using reflective surfaces.
- Highlight symmetry lines using colours.
- Draw one example together step by step.

For learners needing additional support:

- Start with simple shapes first.
- Compare symmetrical and non-symmetrical figures.
- Allow learners to trace symmetry lines with fingers.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Draw shapes with multiple symmetry lines.
- Create symmetrical patterns independently.
- Challenge classmates with symmetry puzzles.
- Explain why a figure is symmetrical.

⇨ Activity B: Draw the Other Half of the Symmetrical Figure

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Observe half-shapes carefully.
- Identify mirror-image relationships.
- Count equal grid distances.
- Draw matching lines and curves.

Observe learners who:

- Cannot complete the missing half correctly.
- Need repeated guidance while drawing.
- Struggle to maintain equal proportions.
- Confuse left and right reflection.

Remediation Support

For learners struggling with mirror drawing:

- Use grid counting step by step.
- Draw guide dots for matching points.
- Compare both halves carefully before drawing.
- Encourage learners to draw lightly first.

For learners needing additional support:

- Use simpler symmetrical figures first.
- Provide guided tracing examples.
- Allow learners to use rulers or grids.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own symmetrical grid figures.
- Draw mirror images independently.
- Challenge classmates with half-shape puzzles.
- Explain how reflection creates symmetry.

Activity C: Complete the Symmetrical Picture

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Observe picture symmetry carefully.
- Identify matching features on both halves.
- Count grid spaces accurately.
- Recognise balanced designs visually.

Observe learners who:

- Cannot complete the picture proportionally.
- Need repeated guidance while copying details.
- Struggle with spatial placement.
- Forget matching distances across the symmetry line.

Remediation Support

For learners struggling with picture completion:

- Complete one section at a time together.
- Use grid counting to place features correctly.
- Highlight matching points using coloured markers.
- Encourage learners to compare both halves continuously.

For learners needing additional support:

- Use simpler symmetrical pictures first.
- Provide guided examples before independent work.
- Allow learners to work collaboratively.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Draw their own symmetrical cartoon or object.
- Create advanced mirror-image designs.
- Challenge classmates with symmetry activities.
- Explain how symmetry improves balance in pictures.

Concept 2.3: Logical Analysis (LB Pages 28–31)

⇨ Activity A: Count the Squares

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Identify small and large squares in figures.
- Observe overlapping shapes carefully.
- Count shapes systematically.
- Recognise hidden squares in patterns.

Observe learners who:

- Miss hidden or larger squares.
- Double-count shapes.
- Need repeated visual guidance.
- Struggle to count systematically.

Remediation Support

For learners struggling with counting shapes:

- Count one size of square at a time.
- Highlight counted squares using colours.
- Use rulers or tracing outlines for guidance.
- Demonstrate systematic counting slowly.

For learners needing additional support:

- Start with smaller square puzzles first.
- Use finger tracking during counting.
- Allow learners to verify counts with partners.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own square-count puzzle.
- Design puzzles with hidden shapes.
- Challenge classmates with counting activities.
- Explain strategies used for counting efficiently.

➪ Activity B: Identify the Missing Figure

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Observe visual patterns carefully.
- Compare shapes and directions.
- Predict missing parts logically.
- Recognise pattern changes step by step.

Observe learners who:

- Cannot identify the pattern rule.
- Guess answers randomly.
- Need repeated visual support.
- Struggle to eliminate incorrect options.

Remediation Support

For learners struggling with pattern analysis:

- Discuss one pattern change at a time.
- Highlight differences between figures.
- Compare each option carefully.
- Encourage learners to explain their reasoning aloud.

For learners needing additional support:

- Use simpler visual patterns first.
- Provide guided examples before independent solving.
- Allow learners to work in pairs.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own missing-figure puzzle.
- Design visual pattern sequences.
- Challenge classmates with logical pattern games.
- Explain how they identified the correct figure.

➪ Activity C: Logical Reasoning Questions

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Read reasoning questions carefully.
- Identify clues and key information.
- Perform simple calculations mentally.
- Compare answer options logically.

Observe learners who:

- Need repeated support understanding questions.
- Confuse clues and conditions.
- Guess answers without reasoning.
- Struggle to eliminate incorrect options.

Remediation Support

For learners struggling with reasoning:

- Read one question at a time together.
- Highlight important information in the question.
- Break the problem into smaller steps.
- Encourage learners to explain answers aloud.

For learners needing additional support:

- Use simpler logic questions first.
- Provide guided reasoning examples.
- Allow learners to solve collaboratively.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own logical reasoning questions.
- Write puzzle clues for classmates.
- Challenge classmates with analytical tasks.
- Explain step-by-step reasoning strategies.

Concept 2.4: Odd One Out (LB Pages 32–33)

⇨ Activity A: Identify the Odd Number

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Recognise number patterns carefully.
- Compare sequences logically.
- Identify numbers following a common rule.
- Detect numbers that break the pattern.

Observe learners who:

- Cannot identify the common rule.
- Need repeated support analysing sequences.
- Guess answers randomly.
- Struggle to explain why a number is different.

Remediation Support

For learners struggling with number patterns:

- Discuss one sequence at a time.
- Highlight the repeated pattern clearly.
- Compare numbers step by step.
- Encourage learners to explain the rule aloud.

For learners needing additional support:

- Start with simpler sequences first.
- Use colour coding for matching patterns.
- Allow partner discussion during analysis.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own odd-number puzzles.
- Write pattern-based sequences independently.
- Challenge classmates with number analysis tasks.
- Explain why a number does not belong.

➪ Activity B: Identify the Odd Word

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Classify words into categories.
- Recognise similarities between words.
- Identify words with different meanings or groups.
- Compare vocabulary logically.

Observe learners who:

- Cannot identify the category correctly.
- Need repeated support with classification.
- Guess answers without analysis.
- Struggle to explain why a word is different.

Remediation Support

For learners struggling with classification:

- Discuss one word group at a time.
- Highlight common categories clearly.
- Compare similar and different words visually.
- Encourage learners to explain their choices aloud.

For learners needing additional support:

- Use picture-word cards for grouping activities.
- Start with familiar categories first.
- Allow learners to work collaboratively.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own odd-word puzzles.
- Group words into new categories.
- Challenge classmates with classification games.
- Explain category relationships independently.

Concept 2.5: Wonderful Sudoku (LB Pages 34–37)

Activity A: Solve the Sudoku with Numbers

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Recognise numbers 1 to 4 correctly.
- Identify repeated numbers in rows and columns.
- Observe patterns carefully.
- Follow Sudoku rules logically.

Observe learners who:

- Repeat numbers incorrectly in rows or columns.
- Need repeated guidance with Sudoku rules.
- Guess answers randomly.
- Struggle to check rows, columns, and boxes systematically.

Remediation Support

For learners struggling with Sudoku:

- Explain Sudoku rules step by step.
- Check one row and one column at a time.
- Use elimination to remove impossible numbers.
- Encourage learners to verify each entry carefully.

For learners needing additional support:

- Use partially completed smaller Sudoku grids first.
- Highlight rows and columns visually.
- Allow learners to solve collaboratively.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own 4×4 Sudoku puzzle.
- Solve larger Sudoku grids independently.
- Challenge classmates with number puzzles.
- Explain Sudoku-solving strategies step by step.

Activity B: Solve the Sudoku with Letters

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Recognise letters E, F, G, and H correctly.
- Observe repeated letters in rows and columns.
- Follow Sudoku rules using letters.
- Compare positions logically.

Observe learners who:

- Repeat letters incorrectly.
- Need repeated support with letter placement.
- Confuse Sudoku rules.
- Struggle to analyse rows and columns carefully.

Remediation Support

For learners struggling with letter Sudoku:

- Explain that Sudoku rules stay the same with letters.
- Check one row and one column at a time together.
- Use elimination strategies for missing letters.
- Encourage learners to verify entries carefully.

For learners needing additional support:

- Start with partially completed letter grids first.
- Highlight rows and columns visually.
- Allow learners to work with partners.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own letter-based Sudoku puzzle.
- Use different letters independently.
- Challenge classmates with Sudoku games.
- Explain how logic helps solve Sudoku puzzles.

Coding Challenge – 2: Overlook and Recall (LB Page 38)

Activity: Observe and Recall

Diagnostic Check (Work Individually)

Before the activity, ask learners to:

- Observe pictures and words carefully.
- Identify details such as shapes, colours, and objects.
- Recall information after short observation.
- Recognise visual patterns quickly.

Observe learners who:

- Cannot recall items accurately.
- Need repeated support with memory tasks.
- Miss important details while observing.
- Struggle to organise recalled information logically.

Remediation Support

For learners struggling with recall:

- Show fewer objects first for memory practice.
- Encourage learners to group objects mentally.
- Use repetition and verbal recall strategies.
- Discuss visual details before covering the picture.

For learners needing additional support:

- Allow extra observation time.
- Use memory games with fewer items first.
- Encourage learners to describe objects aloud.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own memory challenge activity.
- Draw and recall additional object sets.
- Challenge classmates with observation games.
- Explain strategies that help improve memory recall.

Concept 3.1: Ascending and Descending

(LB Pages 40–42)

⇨ Activity A: Arrange the Numbers in Ascending Order

Diagnostic Check

(Work in Pairs)

Before the activity, ask learners to:

- Compare numbers correctly.
- Identify the smallest and largest values.
- Read number sequences carefully.
- Arrange numbers from least to greatest.

Observe learners who:

- Confuse the order of numbers.
- Need repeated support comparing values.
- Struggle to identify the smallest number first.
- Make errors while sequencing numbers.

Remediation Support

For learners struggling with ascending order:

- Use number cards for comparison practice.
- Highlight the smallest number first.
- Arrange numbers step by step together.
- Use number lines for support.

For learners needing additional support:

- Start with smaller numbers first.
- Practise ordering games regularly.
- Allow learners to work with partners.

Extension Activity

(Work Individually / in Groups)

Ask fast learners to:

- Create their own ascending-order number sets.
- Use larger numbers independently.
- Challenge classmates with ordering tasks.
- Explain strategies for arranging numbers quickly.

➪ Activity B: Arrange the Numbers in Descending Order

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Identify the greatest number in a group.
- Compare numbers logically.
- Arrange numbers from largest to smallest.
- Read numerical patterns carefully.

Observe learners who:

- Confuse ascending and descending order.
- Need repeated guidance while comparing numbers.
- Struggle to identify the largest value.
- Make sequencing errors frequently.

Remediation Support

For learners struggling with descending order:

- Use colour coding to highlight larger numbers.
- Arrange numbers step by step together.
- Use place-value discussion for comparison.
- Encourage learners to check the order carefully.

For learners needing additional support:

- Start with smaller sets of numbers first.
- Practise number-order games regularly.
- Allow partner support during sequencing.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create larger descending-order challenges.
- Write and solve number-order puzzles.
- Challenge classmates with mixed-order tasks.
- Explain how to compare numbers efficiently.

➪ Activity C: Count and Write – 6 More

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Add 6 to numbers mentally.
- Recognise number patterns after addition.

- Arrange results in descending order.
- Compare new totals carefully.

Observe learners who:

- Make calculation errors frequently.
- Need repeated support adding 6 correctly.
- Struggle to arrange results logically.
- Confuse original and resulting numbers.

Remediation Support

For learners struggling with addition:

- Use number lines to add 6 step by step.
- Count aloud while adding.
- Highlight the resulting numbers clearly.
- Check calculations together before ordering.

For learners needing additional support:

- Use smaller numbers first.
- Provide guided examples before independent work.
- Allow learners to use counters for support.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create "add and arrange" activities independently.
- Use larger values for calculations.
- Challenge classmates with ordering tasks.
- Explain how the numbers change after addition.

Concept 3.2: Pie Chart (LB Page 43)

⇨ Activity A: Study the Pie Chart and Answer the Questions

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Identify sections of a pie chart.
- Compare large and small slices visually.
- Read chart labels carefully.
- Recognise categories represented in the chart.

Observe learners who:

- Cannot interpret chart sections correctly.

- Need repeated support comparing slices.
- Confuse categories in the chart.
- Struggle to identify largest and smallest values.

Remediation Support

For learners struggling with pie charts:

- Explain that larger slices represent larger quantities.
- Compare two slices at a time.
- Use real pie or paper-circle demonstrations.
- Highlight labels clearly while discussing.

For learners needing additional support:

- Use simplified pie charts first.
- Practise identifying largest and smallest sections.
- Allow learners to discuss answers with partners.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own pie chart using survey data.
- Write questions based on the chart.
- Compare categories independently.
- Explain how pie charts represent information visually.

Concept 3.3: Binary Code (LB Pages 44–48)

Activity A: Create Binary Codes for the Images

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Recognise coloured and blank boxes in grids.
- Understand that 1 represents coloured and 0 represents blank.
- Read rows systematically from left to right.
- Observe visual patterns carefully.

Observe learners who:

- Confuse 0 and 1 representation.
- Skip boxes while coding rows.
- Need repeated visual guidance.
- Struggle to convert pictures into binary patterns.

Remediation Support

For learners struggling with binary coding:

- Explain coloured and blank box representation slowly.
- Code one row at a time together.
- Use coloured markers for clarity.
- Encourage learners to point to each box while coding.

For learners needing additional support:

- Start with smaller binary grids first.
- Use guided examples before independent work.
- Allow learners to work with partners.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own binary-image pattern.
- Convert simple drawings into binary codes.
- Challenge classmates with binary puzzles.
- Explain how computers use 0 and 1.

Activity B: Write Binary Codes for the Given Images

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Observe image grids carefully.
- Recognise coloured and blank sections logically.
- Write binary sequences row by row.
- Compare patterns accurately.

Observe learners who:

- Misplace binary digits in rows.
- Need repeated support identifying coloured boxes.
- Struggle to maintain sequence order.
- Forget coding rules during writing.

Remediation Support

For learners struggling with binary sequences:

- Highlight coloured boxes before coding.
- Write one row together as practice.
- Encourage learners to double-check each row.
- Use colour coding for guidance.

For learners needing additional support:

- Use simpler binary images first.
- Practise coding small rows separately.
- Allow collaborative work during coding.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Design their own binary-coded images.
- Decode classmates' binary patterns.
- Write longer binary sequences independently.
- Explain how binary patterns create pictures.

Activity C: Colour the Boxes

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Recognise 0 and 1 patterns correctly.
- Follow colouring instructions carefully.
- Observe grid positions systematically.
- Predict the image formed by coding.

Observe learners who:

- Colour incorrect boxes.
- Need repeated support with binary rules.
- Skip rows while colouring.
- Struggle to follow the coding sequence logically.

Remediation Support

For learners struggling with colouring patterns:

- Explain that only boxes with 1 are coloured.
- Colour one row at a time together.
- Use finger tracking across rows.
- Check rows before moving to the next.

For learners needing additional support:

- Use smaller grids for practice first.
- Provide guided colouring demonstrations.
- Allow learners to work with partners.

Extension Activity

(Work Individually / in Groups)

Ask fast learners to:

- Create their own binary-colouring puzzle.
- Design hidden pictures using 0 and 1.
- Challenge classmates with binary-image games.
- Explain how binary coding forms graphics.

Concept 3.4: Data Compression

(LB Pages 49–51)

Activity A: Match the Abbreviations

Diagnostic Check

(Work in Pairs)

Before the activity, ask learners to:

- Recognise common abbreviations.
- Read full forms correctly.
- Match short forms with meanings.
- Identify abbreviations used in daily life.

Observe learners who:

- Cannot identify abbreviation meanings.
- Need repeated vocabulary support.
- Confuse similar abbreviations.
- Struggle to connect short forms with full forms.

Remediation Support

For learners struggling with abbreviations:

- Read abbreviations and meanings aloud together.
- Use flashcards with short forms and full forms.
- Discuss where abbreviations are used in real life.
- Practise matching one abbreviation at a time.

For learners needing additional support:

- Start with familiar abbreviations first.
- Use visual aids and posters.
- Allow learners to work in pairs.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own abbreviation chart.
- Find additional abbreviations used online or in books.
- Challenge classmates with matching games.
- Explain how abbreviations save space and time.

Activity B: Decode the Compressed Story

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Recognise picture symbols in stories.
- Replace images with words logically.
- Read story sentences carefully.
- Understand how pictures represent information.

Observe learners who:

- Cannot identify picture meanings correctly.
- Need repeated support decoding the story.
- Struggle to form meaningful sentences.
- Forget words while rewriting the story.

Remediation Support

For learners struggling with decoding:

- Discuss one picture symbol at a time.
- Read the story aloud together slowly.
- Replace images with words step by step.
- Encourage learners to verify sentence meaning.

For learners needing additional support:

- Use simpler picture stories first.
- Provide guided examples before rewriting.
- Allow learners to decode collaboratively.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own compressed picture story.
- Write coded messages using symbols.
- Challenge classmates with decoding puzzles.
- Explain how compression reduces information size.

Coding Challenge – 3: Addition Maze (LB Page 52)

⇨ Activity: Find the Correct Path in the Maze

Diagnostic Check

(Work in Pairs)

Before the activity, ask learners to:

- Solve simple addition problems accurately.
- Follow paths in a maze carefully.
- Compare possible routes logically.
- Identify correct answers before choosing a path.

Observe learners who:

- Choose routes without solving sums.
- Make repeated addition errors.
- Need repeated support following maze paths.
- Struggle to track progress through the maze.

Remediation Support

For learners struggling with maze calculations:

- Solve one addition problem at a time together.
- Trace paths with fingers before drawing.
- Highlight correct answers visually.
- Encourage learners to verify sums before moving.

For learners needing additional support:

- Start with simpler addition mazes first.
- Provide guided maze-solving examples.
- Allow learners to work collaboratively.

Extension Activity

(Work Individually / in Groups)

Ask fast learners to:

- Create their own addition maze puzzle.
- Use larger sums independently.
- Challenge classmates with maze games.
- Explain how logical steps help solve the maze.

Level 4: Algorithmic Intelligence

Concept 4.1: Algorithm

(LB Pages 54–56)

Activity A: Complete the Algorithm

Diagnostic Check

(Work in Pairs)

Before the activity, ask learners to:

- Identify steps in a sequence correctly.
- Read instruction-based activities carefully.
- Recognise beginning and ending stages of a process.
- Understand that algorithms follow a fixed order.

Observe learners who:

- Skip steps while sequencing.
- Need repeated support understanding algorithms.
- Struggle to identify missing instructions.
- Confuse the logical order of actions.

Remediation Support

For learners struggling with algorithms:

- Use simple daily-life examples of step-by-step tasks.
- Explain one instruction at a time.
- Highlight keywords such as Start and End.
- Encourage learners to verbalise the sequence aloud.

For learners needing additional support:

- Use picture cards for sequencing practice.
- Start with shorter algorithms first.
- Allow learners to work collaboratively.

Extension Activity

(Work Individually / in Groups)

Ask fast learners to:

- Create their own algorithm for a simple task.
- Write step-by-step instructions independently.
- Challenge classmates with missing-step algorithms.
- Explain why sequence matters in algorithms.

⇨ Activity B: Algorithm for Addition and Multiplication

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Read numerical instructions carefully.
- Perform simple addition and multiplication.
- Recognise input and output in calculations.
- Follow step-by-step mathematical processes.

Observe learners who:

- Make calculation errors frequently.
- Need repeated guidance while following the algorithm.
- Confuse addition and multiplication operations.
- Struggle to identify outputs correctly.

Remediation Support

For learners struggling with calculations:

- Solve one operation at a time together.
- Use counters or multiplication arrays for support.
- Highlight input and output values clearly.
- Encourage learners to check answers carefully.

For learners needing additional support:

- Use smaller numbers first.
- Provide guided examples before independent solving.
- Allow learners to use number lines or charts.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create algorithms for subtraction or division.
- Write algorithms using larger numbers independently.
- Challenge classmates with arithmetic algorithms.
- Explain the difference between input and output.

⇨ Activity C: Algorithm to Prepare Tea

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Identify steps involved in making tea.
- Arrange cooking instructions logically.

- Read instructions carefully.
- Recognise the importance of sequence in tasks.

Observe learners who:

- Mix up the order of cooking steps.
- Need repeated support with sequencing.
- Struggle to identify missing words.
- Forget the purpose of specific ingredients or actions.

Remediation Support

For learners struggling with sequencing:

- Discuss one cooking step at a time.
- Use real or picture-based kitchen items for demonstration.
- Arrange step cards physically before writing.
- Encourage learners to describe the process aloud.

For learners needing additional support:

- Use simpler recipe sequences first.
- Provide guided examples before independent work.
- Allow learners to work with partners.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Write an algorithm for preparing another drink or food.
- Create sequencing charts independently.
- Challenge classmates with recipe algorithms.
- Explain why instructions must follow a correct order.

Concept 4.2: Programs: Conditions (LB Pages 57–59)

➪ Activity A: Complete the Conditional Program

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Recognise if–then–else statements.
- Identify true and false conditions.
- Read conditional rules carefully.
- Understand pass and fail outcomes logically.

Observe learners who:

- Cannot understand conditional statements clearly.

- Confuse "then" and "else" outcomes.
- Need repeated teacher guidance.
- Struggle to identify the correct result.

Remediation Support

For learners struggling with conditions:

- Use simple classroom examples of conditions and outcomes.
- Highlight condition words clearly.
- Discuss one condition at a time.
- Encourage learners to explain outcomes aloud.

For learners needing additional support:

- Use picture-based if–then examples.
- Role-play condition situations.
- Repeat condition-based games regularly.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own pass/fail condition program.
- Write new if–then–else statements.
- Challenge classmates with conditional puzzles.
- Explain how computers make decisions using conditions.

Activity B: Complete the Conditional Statements

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Recognise cause-and-effect relationships.
- Complete simple logical sentences.
- Identify everyday situations with conditions.
- Read and interpret conditional statements carefully.

Observe learners who:

- Cannot predict logical outcomes.
- Need repeated support understanding conditions.
- Struggle to complete meaningful statements.
- Confuse causes and results.

Remediation Support

For learners struggling with conditional reasoning:

- Discuss one statement at a time.
- Use real-life examples such as rain, food, or traffic signals.
- Encourage learners to explain why the result happens.
- Use role-play for everyday condition examples.

For learners needing additional support:

- Start with simpler conditions first.
- Provide guided examples before independent work.
- Allow learners to discuss answers with partners.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Write their own if–then situations.
- Create condition cards for classmates.
- Challenge classmates with logical statements.
- Explain how conditions influence decisions.

Activity C: Apply Conditions Using Numbers

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Identify numbers divisible by 2 and 3.
- Perform simple divisibility checks mentally.
- Recognise patterns in even and odd numbers.
- Follow colour instructions carefully.

Observe learners who:

- Cannot identify divisible numbers correctly.
- Need repeated support applying conditions.
- Confuse divisibility rules.
- Struggle to follow colour coding logically.

Remediation Support

For learners struggling with divisibility:

- Review divisibility rules for 2 and 3.
- Use counters to group numbers physically.
- Highlight divisible numbers step by step.
- Encourage learners to check calculations aloud.

For learners needing additional support:

- Start with smaller numbers first.
- Provide guided examples before colouring.
- Allow partner support during classification.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own divisibility-colour puzzles.
- Use larger numbers independently.
- Challenge classmates with condition-based number games.
- Explain how divisibility rules work.

Concept 4.3: Programs: Loops (LB Pages 60–62)

⇨ Activity A: Follow the Given Programs

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Recognise repeated instructions in a sequence.
- Follow colouring patterns carefully.
- Identify repeated actions in loops.
- Read step-by-step programs logically.

Observe learners who:

- Cannot follow repeated instructions correctly.
- Need repeated support with loop sequences.
- Skip steps while repeating actions.
- Struggle to maintain the colouring pattern.

Remediation Support

For learners struggling with loops:

- Explain what "repeat" means using simple examples.
- Perform one loop cycle together first.
- Use arrows and colours to show repeated actions clearly.
- Encourage learners to count repetitions aloud.

For learners needing additional support:

- Start with shorter loops first.
- Use movement games to demonstrate repetition.
- Allow learners to work collaboratively.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own loop-colouring program.
- Design repeating patterns independently.
- Challenge classmates with loop tasks.
- Explain how loops reduce repeated instructions.

Activity B: Colour the Stairs Using the Loop

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Identify repeated colour sequences.
- Follow movement instructions carefully.
- Recognise up-and-down directional patterns.
- Understand how loops repeat instructions automatically.

Observe learners who:

- Confuse colour order during repetition.
- Need repeated support following the loop.
- Skip movement steps incorrectly.
- Struggle to identify the repeated pattern.

Remediation Support

For learners struggling with loop repetition:

- Perform one loop cycle together slowly.
- Highlight repeated instructions clearly.
- Use coloured markers for visual guidance.
- Encourage learners to count repetitions aloud.

For learners needing additional support:

- Start with simpler stair patterns first.
- Use physical step movement demonstrations.
- Allow learners to work in pairs.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Create their own stair-colouring loop.
- Design repeated movement patterns independently.
- Challenge classmates with loop programs.
- Explain how loops simplify repeated work.

Coding Challenge – 4: Banana Muffin (LB Page 63)

Activity: Arrange the Steps to Make Banana Muffins

Diagnostic Check *(Work in Pairs)*

Before the activity, ask learners to:

- Identify steps in a recipe logically.
- Read cooking instructions carefully.
- Recognise beginning, middle, and ending stages in a process.
- Arrange activities in the correct sequence.

Observe learners who:

- Mix up the order of recipe steps.
- Need repeated support with sequencing.
- Skip important preparation stages.
- Struggle to explain why one step comes before another.

Remediation Support

For learners struggling with sequencing:

- Discuss one cooking step at a time.
- Use pictures of ingredients and utensils for support.
- Arrange step cards physically before numbering them.
- Encourage learners to verbalise the process aloud.

For learners needing additional support:

- Start with shorter recipe sequences first.
- Provide guided examples before independent ordering.
- Allow learners to work with partners.

Extension Activity *(Work Individually / in Groups)*

Ask fast learners to:

- Write algorithms for preparing another food item.
- Create recipe-sequencing puzzles for classmates.
- Design flowcharts for cooking processes.
- Explain why sequence is important in recipes and programs.

Core Competencies Mapping

LEVEL 1: REASONING

Concept	Core Competencies Developed
1.1 Number Combinations	Critical Thinking and Problem Solving (CP)
1.2 Arithmagons	Critical Thinking and Problem Solving (CP); Digital Literacy (DL)
1.3 Graphical Addition	Critical Thinking and Problem Solving (CP); Digital Literacy (DL)
1.4 Word Hunt	Critical Thinking and Problem Solving (CP)
1.5 Word Pattern	Critical Thinking and Problem Solving (CP); Digital Literacy (DL)
1.6 Rhyming Words	Critical Thinking and Problem Solving (CP)
Coding Challenge-1: Open the Safe	Critical Thinking and Problem Solving (CP); Digital Literacy (DL)

LEVEL 2: CRITICAL THINKING AND ANALYSIS

Concept	Core Competencies Developed
2.1 Mysterious Pictures	Critical Thinking and Problem Solving (CP)
2.2 Symmetrical Images	Critical Thinking and Problem Solving (CP); Creativity and Innovation (CI)
2.3 Logical Analysis	Critical Thinking and Problem Solving (CP); Digital Literacy (DL)
2.4 Odd One Out	Critical Thinking and Problem Solving (CP)
2.5 Wonderful Sudoku	Critical Thinking and Problem Solving (CP); Digital Literacy (DL)
Coding Challenge-2: Overlook and Recall	Critical Thinking and Problem Solving (CP); Personal Development and Leadership (PL)

LEVEL 3: DATA PROCESSING

Concept	Core Competencies Developed
3.1 Ascending and Descending	Digital Literacy (DL); Critical Thinking and Problem Solving (CP)
3.2 Pie Chart	Critical Thinking and Problem Solving (CP)
3.3 Binary Code	Digital Literacy (DL); Critical Thinking and Problem Solving (CP)
3.4 Data Compression	Digital Literacy (DL); Critical Thinking and Problem Solving (CP)
Coding Challenge-3: Addition Maze	Critical Thinking and Problem Solving (CP); Digital Literacy (DL)

LEVEL 4: ALGORITHMIC INTELLIGENCE

Concept	Core Competencies Developed
4.1 Algorithm	Critical Thinking and Problem Solving (CP); Digital Literacy (DL); Creativity and Innovation (CI)
4.2 Programs: Conditions	Critical Thinking and Problem Solving (CP); Digital Literacy (DL)
4.3 Programs: Loops	Critical Thinking and Problem Solving (CP); Digital Literacy (DL)
Coding Challenge-4: Banana Muffin	Critical Thinking and Problem Solving (CP); Digital Literacy (DL)

Facilitator's Page-wise Teaching Instructions

1 Level Reasoning

Reasoning activities help learners develop observation, numerical thinking, pattern recognition, vocabulary building, and logical analysis skills. These abilities form an important foundation for computational thinking and prepare learners for coding concepts such as patterns, relationships, sequences, and structured problem solving.

In this level, learners engage with colourful and engaging tasks that require them to create number combinations, solve numerical puzzles, observe visual representations of addition, search for hidden words, identify word patterns, and recognise rhyming sounds. These activities strengthen learners' ability to observe details, analyse relationships, and organise information logically.

Through these activities, learners begin to understand that complex problems can often be solved by breaking them into smaller parts and applying logical rules, which is a key principle in coding and algorithmic thinking.

Concept 1.1: Number Combinations

(LB Pages 8–10)

Teaching Intent

To help learners understand that a number can be formed using different combinations of smaller numbers. Through colourful visual examples and number activities, learners explore how numbers can be added together in various ways to produce the same total.

This activity strengthens learners' addition skills, observation ability, and logical thinking, which are essential for computational thinking and early coding concepts.

Concept Explanation

A combination refers to different ways of grouping numbers to obtain the same result. In combinations, the order of selection does not matter.

For example, using the numbers 5, 10, and 20, we can form different combinations that make the number 40.

Examples:

$20 + 20 = 40$

$20 + 10 + 10 = 40$

$10 + 10 + 10 + 10 = 40$

$10 + 10 + 10 + 5 + 5 = 40$

$10 + 10 + 5 + 5 + 5 + 5 = 40$

$10 + 5 + 5 + 5 + 5 + 5 + 5 = 40$

$5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40$

These examples show that many combinations can produce the same total number.

Understanding number combinations helps learners develop flexible thinking in mathematics and problem-solving.

➪ Activity A: Form Number Combinations (Total = 85)

Teacher Instructions

- Ask learners to observe the numbers provided: 50, 30, 20, 10, and 5.
- Explain that they must combine these numbers to obtain a total of 85.
- Encourage learners to find at least six different combinations.
- Remind learners that they can use more than two numbers to reach the total.

Teacher–Learner Interaction

Ask guiding questions such as:

- If we start with 50, what numbers can we add to reach 85?
- Can we combine 30 and 20 with another number to reach 85?
- What number must be added if we already have 50 and 30?

Encourage learners to try different combinations and verify their totals.

Teacher Guidance

Help learners understand that:

- Numbers can be added in different ways to produce the same total.
- Logical reasoning helps identify multiple valid combinations.
- Checking calculations ensures accuracy.

Reinforce

A number can be represented using many different combinations.

➪ Activity B: Form Number Combinations (Total = 200)

Teacher Instructions

- Ask learners to observe the numbers: 150, 100, 50, 30, and 10.
- Explain that they must combine these numbers to obtain a total of 200.
- Encourage learners to explore several possible combinations.

Teacher–Learner Interaction

Ask guiding questions such as:

- What happens if we combine 150 and 50?

- Can we make 200 using four numbers?
- What combinations can be made using 100?

Encourage learners to discuss their ideas with classmates.

Teacher Guidance

Explain that:

- Larger numbers can be broken into smaller parts.
- Multiple combinations may give the same total.
- Logical experimentation helps find solutions.

Reinforce

Mathematics often allows more than one correct method to reach an answer.

Activity C: Complete the Number Sums

Teacher Instructions

- Ask learners to read the instructions carefully.
- Explain that they must use the numbers 5, 10, 15, 20, 25, and 30.
- Learners must select suitable numbers that add up to the given totals.
- Encourage learners to try different combinations before choosing their answers.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which three numbers can add up to 20?
- How can we make 40 using four numbers?
- Which numbers combine to form 70 or 80?

Encourage learners to perform the addition step by step.

Teacher Guidance

Help learners understand that:

- Numbers can be broken into parts in different ways.
- Addition helps build number relationships.
- Logical thinking improves accuracy in solving such problems.

Reinforce

Breaking numbers into combinations helps learners understand addition and prepares them for solving mathematical and coding problems

Concept 1.2: Arithmagons (LB Pages 11–12)

Teaching Intent

To help learners understand the relationship between numbers through addition-based puzzles. In this activity, learners practise logical reasoning by identifying numbers placed at the vertices of a shape using the rule that each side equals the sum of the two adjacent vertex numbers.

Arithmagon puzzles strengthen learners' addition skills, number relationships, and logical thinking, which are important foundations for computational thinking and coding concepts.

Concept Explanation

An arithmagon is a polygon such as a triangle, rectangle, or square where numbers are placed at the vertices (corners) and on the sides.

The rule of an arithmagon is:

The number written on each side is the sum of the two numbers placed at the adjacent vertices.

Example:

If the two vertex numbers are 2 and 3, then the value of the side between them is:

$2 + 3 = 5$

To solve an arithmagon puzzle:

1. Start with the smallest side number.
2. Think of two numbers that add up to that value.
3. Write those numbers in the adjacent vertices.
4. Continue using the same rule to fill the remaining vertices.

Through this method, all missing numbers can be determined logically.

⇨ Activity A: Solve the Arithmagons

Teacher Instructions

- Ask learners to observe the arithmagon diagrams carefully.
- Explain that the numbers written on the sides represent the sum of the two adjacent corner numbers.
- Tell learners to find the missing numbers in the circles.
- Encourage learners to start with the smallest side value to make the puzzle easier.

Teacher–Learner Interaction

Ask guiding questions such as:

- If a side shows 5, which two numbers could add up to 5?

- If the side number is 15, what two numbers could form it?
- How can we check whether the numbers placed at the corners are correct?

Encourage learners to test their answers by adding the corner numbers.

Teacher Guidance

Help learners understand that:

- Each side value depends on the sum of two adjacent vertices.
- Logical thinking helps determine the correct numbers.
- Starting with smaller numbers often makes the puzzle easier to solve.

Reinforce

Mathematical puzzles help develop reasoning skills and encourage learners to think step by step.

Concept 1.3: Graphical Addition (LB Page 13)

Teaching Intent

To help learners understand addition using visual representations and graphical elements. Instead of numbers alone, learners observe coloured parts of a circle and count them to determine the total.

This activity helps learners strengthen counting skills, observation ability, and basic addition, while also developing visual reasoning skills. Graphical representations help learners understand mathematical operations in a clear and engaging way, which is useful in computational thinking and problem-solving.

Concept Explanation

Graphical addition is a method of representing numbers using visual objects such as shapes, diagrams, or pictures.

In this activity, circles are divided into equal parts, and some of the parts are coloured. Each coloured section represents one unit.

To solve the problem:

1. Count the coloured parts in the first circle.
2. Count the coloured parts in the second circle.
3. Add the two numbers together.
4. Colour the same number of sections in the result circle.

For example:

If the first circle has 1 coloured part and the second circle has 1 coloured part, then:
1 + 1 = 2

So, the result circle will have two coloured sections.

Graphical addition helps learners connect visual patterns with numerical values.

➪ Activity A: Count and Add the Coloured Pieces

Teacher Instructions

- Ask learners to observe each pair of circles carefully.
- Explain that each coloured section represents one part of a number.
- Tell learners to count the coloured sections in both circles.
- Ask them to add the numbers and colour the correct number of sections in the empty circle.

Teacher–Learner Interaction

Ask guiding questions such as:

- How many coloured sections are in the first circle?
- How many coloured sections are in the second circle?
- What is the total when we add them together?
- How many sections should we colour in the result circle?

Encourage learners to count slowly and check their answers.

Teacher Guidance

Help learners understand that:

- Each coloured section represents one part of a number.
- Counting carefully helps determine the correct answer.
- Visual diagrams make addition easier to understand.

Reinforce

Mathematical ideas can be represented using pictures and diagrams. Visual representations help learners understand concepts more clearly.

Concept 1.4: Word Hunt (LB Pages 14–16)

Teaching Intent

To help learners develop observation, vocabulary recognition, and pattern-searching skills through word grid activities.

In this concept, learners search for hidden words in a grid of letters. These words may appear in different directions such as left to right, right to left, top to bottom, bottom to top, or diagonally.

Word hunt activities encourage learners to carefully scan the grid, identify patterns in letters, and connect them to meaningful words. These tasks strengthen concentration, logical thinking, and visual analysis, which are essential skills for computational thinking and problem solving.

Concept Explanation

A Word Hunt is a puzzle where words are hidden inside a grid of letters.

The words can appear in several directions:

- Left to right
- Right to left
- Top to bottom
- Bottom to top
- Diagonally (top to bottom or bottom to top)

To solve a word hunt puzzle:

1. Read the list of words given.
2. Carefully scan the grid of letters.
3. Identify where the letters of the word appear in sequence.
4. Circle or mark the word once it is found.

Word hunt activities improve learners' letter recognition, vocabulary, and pattern searching skills.

⇨ Activity A: Search the Words in the Grid

Teacher Instructions

- Ask learners to observe the list of words given above the grid.
- Tell learners to read each word carefully.
- Explain that the words are hidden inside the grid of letters.
- Inform learners that the words may appear in different directions.
- Ask learners to search for the words and mark them in the grid.

Teacher–Learner Interaction

Ask guiding questions such as:

- Can you find the word BRAIN in the grid?
- Which direction does the word SCHOOL appear in?
- Do you see the word SMART written diagonally?
- Can you identify the word EARTH from top to bottom?

Encourage learners to scan the grid row by row and column by column.

Teacher Guidance

Help learners understand that:

- Words can appear in different directions in a word grid.
- Observing letter sequences carefully helps locate hidden words.
- Patience and concentration are important when solving word puzzles.

Reinforce

Searching for patterns in letters helps develop observation skills and strengthens vocabulary.

Activity B: Find the Words in the Grid

Teacher Instructions

- Ask learners to read the list of words provided in the activity.
- Explain that these words are hidden in the grid of letters below.
- Inform learners that the words may appear horizontally, vertically, or diagonally.
- Ask learners to search for each word and circle or highlight it in the grid.

Teacher–Learner Interaction

Ask guiding questions such as:

- Can you find the word CODING in the grid?
- Which direction does the word INTERNET appear in?
- Is the word HOMEWORK written horizontally or vertically?
- Can you locate the word LOTUS in the puzzle?

Encourage learners to move their fingers along rows and columns while searching.

Teacher Guidance

Help learners understand that:

- Word hunt puzzles require careful scanning and attention to detail.
- Words may overlap or share letters in the grid.
- Observing letter patterns helps identify hidden words quickly.

Reinforce

Word puzzles strengthen reading skills, vocabulary development, and logical thinking, which are important for problem solving and coding concepts.

Concept 1.5: Word Pattern

(LB Pages 17–18)

Teaching Intent

To help learners recognise patterns in words based on similar spellings or sounds. Word patterns strengthen early language skills and help learners understand how words are formed and related.

Through engaging examples and activities, learners observe how certain groups of letters appear repeatedly in different words. Identifying these similarities helps learners improve reading ability, spelling skills, and pattern recognition, which are important aspects of logical thinking and computational learning.

Concept Explanation

A pattern is a sequence that repeats in a regular and predictable way.

A word pattern is formed when several words share similar letters, sounds, or spelling structures.

For example:

Thing – Three – Thumb – Thanks – Think

All these words begin with the letters "Th", which creates a pattern.

Similarly, other examples include:

Free – Tree – Knee – Three

Sleep – Sheet – Deep – Wheel

Earing – Caring – Gaming – Running

These words follow similar sound patterns or spelling patterns, helping learners recognise relationships between words.

Understanding word patterns helps learners:

- Improve spelling
- Develop vocabulary
- Recognise phonetic patterns in language

⇨ Activity A: Complete the Word Pattern

Teacher Instructions

- Ask learners to observe each set of words carefully.
- Explain that the words follow a particular spelling or sound pattern.
- Tell learners to identify the common pattern in the given words.
- Ask them to write two more words that follow the same pattern.

Teacher–Learner Interaction

Ask guiding questions such as:

- What common letters do you see in Both, Math, Bath?
- What spelling pattern do Good, Roof, Moon follow?
- Can you find other words similar to Peel, Feet, Jeep?
- What common ending do Never, After, Paper share?
- What letters are repeated in Shirt, Shine, Shout?

Encourage learners to say the words aloud to recognise the sound pattern.

Teacher Guidance

Help learners understand that:

- Words may share similar starting letters, endings, or vowel sounds.
- Recognising these patterns helps improve spelling and pronunciation.
- Careful observation helps identify patterns in language.

Reinforce

Word patterns help learners understand how words are structured and improve their reading and writing skills.

Concept 1.6: Rhyming Words

(LB Page 19)

Teaching Intent

To help learners recognise rhyming words, which are words that have similar ending sounds. Identifying rhyming words helps learners improve their phonetic awareness, pronunciation, vocabulary, and listening skills.

Through picture-based clues and simple riddles, learners practise identifying words that sound alike. This activity strengthens language development, sound recognition, and pattern recognition, which are essential for early literacy and logical thinking.

Concept Explanation

Rhyming words are words that have the same or similar ending sounds.

For example:

Boy – Toy

Corn – Horn

Free – Tree

These words end with the same sound, which makes them rhyme.

Rhyming words are often used in:

- poems
- songs
- stories
- word games

Learning rhyming words helps learners develop better pronunciation and listening skills.

Activity A: Identify the Rhyming Word

Teacher Instructions

- Ask learners to read the sentence given in each question.
- Explain that the sentence gives a clue about a rhyming word.
- Ask learners to observe the picture provided beside the question.
- Tell learners to identify the word that rhymes with the given word.
- Ask them to write the correct word in the blank space.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which word rhymes with boy?
- What word sounds similar to corn?
- What rhymes with free?
- Which word rhymes with boss?
- What word sounds like bat?
- Which word rhymes with men?

Encourage learners to pronounce the words aloud to hear the similar sounds.

Teacher Guidance

Help learners understand that:

- Rhyming words have the same ending sound.
- Listening carefully helps identify rhyming words.
- Pictures can provide helpful clues to identify the correct answer.

Reinforce

Recognising rhyming patterns helps learners improve reading, spelling, and pronunciation.

Coding Challenge – 1: Open the Safe (LB Page 20)

Teaching Intent

To help learners apply their number reasoning and logical thinking skills by identifying combinations of numbers that produce a specific total. In this activity, learners analyse the numbers on a safe and select three buttons whose sum equals 100.

This activity strengthens learners' numerical reasoning, problem-solving ability, and logical analysis, which are important foundations for computational thinking and algorithmic thinking.

Activity: Find the Correct Combination

Teacher Instructions

- Ask learners to carefully observe the safe panels shown in the picture.
- Explain that the safe can only be opened by pressing three buttons.
- Tell learners that the sum of the numbers on the three buttons must equal 100.
- Explain that the same button cannot be used twice.
- Ask learners to analyse the numbers and identify the correct combination.
- Tell learners to colour the buttons that form the correct combination.
- Encourage learners to check their addition carefully before finalising their answer.

Teacher–Learner Interaction

Ask guiding questions such as:

- How many buttons are you allowed to press?
- What should the total of the selected numbers be?
- Which numbers can you combine to make 100?
- Can you find more than one possible combination?

Encourage learners to try different number combinations and verify their results.

Teacher Guidance

Encourage learners to:

- Carefully examine all the numbers on the safe panel.
- Try different combinations of three numbers.
- Add the numbers step by step to check whether the total equals 100.
- Verify their answers to make sure the same number is not used twice.

Reinforce

Logical thinking and number combinations help solve puzzles and problems. In coding and programming, computers often follow similar logical rules to find solutions and process information.

Review Exercise

1. Why is it important to read the instructions carefully before solving a puzzle?
2. What rule must the selected numbers follow in this activity?
3. How can checking your addition help avoid mistakes?
4. Why is logical thinking useful when solving number puzzles?

Differentiated Lessons

Remedial Activity

- Provide learners with simpler number puzzles.
- Ask them to find two numbers that add up to a given total.

Challenging Activity

- Ask learners to create their own number puzzle where three numbers must add up to a specific total.
- Let their classmates try to solve the puzzle.

Teacher Closure for Level 1

Summarise the key learning points:

Learners have learned to:

- Identify number combinations
- Solve number puzzles using logical reasoning
- Recognise patterns in numbers
- Analyse problems step by step
- Apply logical thinking to solve challenges

These activities help learners develop reasoning, analytical thinking, and problem-solving skills, which form an important foundation for computational thinking and early coding concepts.

2 Level Critical Thinking & Analysis

Level 2 activities help learners strengthen their logical reasoning, observation, and problem-solving abilities through engaging puzzles and visual challenges. These activities introduce learners to the idea of patterns, comparisons, spatial understanding, and structured thinking, which are essential foundations for computational thinking.

In this level, learners explore tasks such as identifying hidden words, analysing picture clues, recognising symmetry, finding patterns, and solving Sudoku puzzles. Through these activities, learners learn to observe details carefully, compare information, identify relationships, and apply logical rules to arrive at correct solutions.

These activities prepare learners for coding by helping them understand that problems can be solved by analysing information step-by-step and applying logical rules.

Concept 2.1: Mysterious Pictures

(LB Pages 22–24)

Teaching Intent

To help learners develop observation, reasoning, and problem-solving skills through picture-based puzzles and visual thinking activities.

In this concept, learners analyse pictures, identify clues, and use logical thinking to form meaningful words, compare weights, and solve colour-based arithmetic problems. These activities encourage learners to carefully interpret visual information and apply reasoning to reach correct answers.

Such exercises help build early analytical thinking and computational reasoning, which are important foundations for coding and problem solving.

Concept Explanation

Mysterious picture activities are puzzles that require learners to interpret images and extract meaningful information from them.

Learners must observe the pictures carefully and use clues such as:

- the first letter of objects
- comparisons between objects
- simple mathematical operations

These clues help learners solve the puzzle and identify the correct answer.

This process strengthens learners' visual interpretation, logical thinking, and reasoning skills.

Activity A: Form a Word Using the First Letters

Teacher Instructions

- Ask learners to observe each picture carefully.
- Explain that each picture represents an object with a name.
- Tell learners to identify the name of each object.
- Ask them to write the first letter of each word in the boxes provided.
- When all letters are written, learners will form a meaningful word.

Teacher–Learner Interaction

Ask guiding questions such as:

- What object is shown in the first picture?
- What is the first letter of Tiger or Apple?
- When we combine the first letters, what word do we get?
- Can you identify the word formed by the sequence of pictures?

Encourage learners to pronounce each word aloud before writing the first letter.

Teacher Guidance

Help learners understand that:

- Each picture represents an object or thing with a specific name.
- The first letters of the objects combine to form a new word.
- Careful observation helps identify the correct objects and letters.

Reinforce

Observing details and identifying patterns helps learners solve puzzles logically.

Activity B: Compare the Weight

Teacher Instructions

- Ask learners to observe the example showing 1 hen and 2 chicks on a balance scale.
- Explain that the scale shows which side is heavier or lighter.
- Tell learners to observe each picture carefully.
- Ask them to decide whether the objects shown are lighter, heavier, or of the same weight compared with the given example.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which side of the scale goes down?
- What does it mean when one side goes down?

- If there are more chicks, will the weight increase or decrease?
- When will both sides have the same weight?

Encourage learners to think logically before selecting the answer.

Teacher Guidance

Help learners understand that:

- A balance scale helps compare the weights of objects.
- The side that goes down is heavier.
- The side that goes up is lighter.
- Equal objects on both sides mean the same weight.

Reinforce

Comparing quantities helps develop logical reasoning and analytical thinking.

➪ Activity C: Colour the Picture Using Mathematical Answers

Teacher Instructions

- Ask learners to observe the colour code given above the picture.
- Explain that each colour corresponds to a number.
- Tell learners to solve the addition and subtraction problems inside the picture sections.
- After solving, learners must colour each section according to the correct colour code.
- Finally, instruct learners to colour the blank spaces blue.

Teacher–Learner Interaction

Ask guiding questions such as:

- What is the answer to 20 – 11
- Which colour corresponds to the number 9?
- What colour should be used for 3?
- How do we solve 8 – 4?

Encourage learners to solve the calculations step by step.

Teacher Guidance

Help learners understand that:

- Solving arithmetic problems helps determine the correct colour.
- Careful calculation is important to complete the picture correctly.
- Combining mathematics with colouring activities makes learning engaging.

Reinforce

Mathematics can be applied creatively through puzzles, patterns, and visual activities.

Concept 2.2: Symmetrical Images (LB Pages 25–27)

Teaching Intent

To help learners understand the concept of symmetry and identify lines of symmetry in different shapes and figures.

Through visual examples and drawing activities, learners observe how shapes can be divided into two equal halves that mirror each other. These activities encourage learners to develop spatial awareness, observation skills, and logical reasoning.

Understanding symmetry helps learners recognise patterns and structures in shapes, which supports the development of mathematical thinking and computational reasoning.

Concept Explanation

Symmetry occurs when a shape or figure can be divided into two identical halves that match exactly when folded along a line.

This dividing line is called the line of symmetry.

If one half of a figure is reflected across this line, it looks exactly like the other half.

Examples of symmetrical objects include:

- a butterfly
- a leaf
- a star
- a human face

Some shapes may have one line of symmetry, while others may have two or more lines of symmetry.

Understanding symmetry helps learners observe patterns and recognise balanced designs.

Activity A: Find the Number of Lines of Symmetry

Teacher Instructions

- Ask learners to observe each figure carefully.
- Explain that a line of symmetry divides the shape into two identical halves.
- Tell learners to imagine folding the shape along possible lines.
- Ask them to count how many lines divide the shape into equal mirrored parts.
- Instruct learners to write the number of symmetry lines in the box provided.

Teacher–Learner Interaction

Ask guiding questions such as:

- If we fold the shape in the middle, do both sides match?
- Can the shape be divided in more than one way?
- Does the star have more than one line of symmetry?
- Which shapes do not have any lines of symmetry?

Encourage learners to trace possible lines with their fingers.

Teacher Guidance

Help learners understand that:

- A line of symmetry creates two identical mirror halves.
- Some shapes have multiple symmetry lines.
- Some shapes may not have any symmetry.

Reinforce

Symmetry helps us understand balance and patterns in shapes.

✏ Activity B: Draw the Other Half of the Symmetrical Figure

Teacher Instructions

- Ask learners to observe the half-shape drawn on one side of the grid.
- Explain that the vertical line represents the line of symmetry.
- Tell learners to carefully copy the same shape on the other side of the line.
- Ask learners to draw the missing half by matching each point across the line.

Teacher–Learner Interaction

Ask guiding questions such as:

- Where should the next point appear on the opposite side?
- How far is the point from the symmetry line?
- Does the completed shape look the same on both sides?

Encourage learners to count the grid squares while drawing.

Teacher Guidance

Help learners understand that:

- The distance of points from the symmetry line must be equal on both sides.
- Careful observation helps maintain the correct shape.
- Grid lines help guide accurate drawing.

Reinforce

Symmetry can be created by reflecting shapes across a line.

➪ Activity C: Complete the Symmetrical Picture

Teacher Instructions

- Ask learners to observe the half-picture drawn on the grid.
- Explain that the picture needs to be completed using symmetry.
- Tell learners to copy each part of the picture onto the other side of the grid.
- Encourage them to carefully match the curves, lines, and shapes.

Teacher–Learner Interaction

Ask guiding questions such as:

- Where should the eye or ear appear on the opposite side?
- How many squares away from the centre line is each part?
- Does the completed picture look balanced?

Encourage learners to draw lightly first and then darken the final lines.

Teacher Guidance

Help learners understand that:

- Symmetrical drawings require careful observation of shapes and distances.
- Grid squares help maintain correct proportions.
- Completing symmetrical pictures develops spatial reasoning.

Reinforce

Symmetry is widely used in art, design, architecture, and nature.

Concept 2.3: Logical Analysis (LB Pages 28–31)

Teaching Intent

To help learners develop logical reasoning, observation skills, and analytical thinking through visual puzzles, pattern recognition, and reasoning-based questions.

In this concept, learners analyse diagrams, identify patterns, count shapes, and solve logical questions. These activities encourage learners to observe details carefully, recognise relationships between elements, and apply reasoning to find solutions.

Logical analysis strengthens problem-solving ability, pattern recognition, and decision-making skills, which are essential foundations for computational thinking and coding.

Concept Explanation

Logical analysis means examining information carefully and using reasoning to solve problems.

To solve logical puzzles, learners must:

- observe the information given
- identify patterns or relationships
- analyse the clues step by step
- select the correct answer logically

Logical puzzles may include:

- counting shapes or objects
- completing visual patterns
- solving reasoning questions
- identifying relationships between numbers or words

Practising such activities helps learners think systematically and solve problems efficiently.

Activity A: Count the Squares

Teacher Instructions

- Ask learners to observe each puzzle carefully.
- Explain that the diagram contains small squares as well as larger squares formed by combining smaller ones.
- Tell learners to count all possible squares in the picture.
- Encourage them to count systematically from smaller squares to larger squares.
- Ask learners to write the total number of squares in the blank space provided.

Teacher–Learner Interaction

Ask guiding questions such as:

- How many small squares can you see?
- Can you find larger squares made from smaller ones?
- Are there squares hidden inside the figure?
- Have you checked every part of the puzzle?

Encourage learners to count slowly and verify their answers.

Teacher Guidance

Help learners understand that:

- Squares may appear in different sizes within a figure.
- Some squares are formed by combining smaller squares.
- Careful observation helps identify hidden shapes.

Reinforce

Counting shapes carefully improves observation and analytical thinking.

Activity B: Identify the Missing Figure

Teacher Instructions

- Ask learners to observe the given pattern carefully.
- Explain that one part of the figure is missing.
- Tell learners to analyse how the pattern changes across the figure.
- Ask them to compare each option provided.
- Instruct learners to select the figure that correctly completes the pattern.

Teacher–Learner Interaction

Ask guiding questions such as:

- What changes do you notice in each part of the pattern?
- Do the lines rotate or move in a specific direction?
- Which option matches the pattern shown in the puzzle?
- Which option does not follow the same pattern rule?

Encourage learners to eliminate incorrect options step by step.

Teacher Guidance

Help learners understand that:

- Patterns follow a logical rule or sequence.
- Observing how shapes change helps identify the correct continuation.
- Comparing all options carefully helps select the correct answer.

Reinforce

Pattern recognition is an important skill used in mathematics and coding.

Activity C: Logical Reasoning Questions

Teacher Instructions

- Ask learners to read each question carefully.
- Encourage them to understand the information provided in the question.
- Tell learners to analyse the clues step by step before choosing an answer.
- Ask them to tick (✓) the correct option.

Teacher–Learner Interaction

Ask guiding questions such as:

- What information is given in the question?

- What calculation or reasoning is required?
- Can we eliminate any incorrect options?
- Which answer best fits the situation described?

Encourage learners to explain their reasoning.

Teacher Guidance

Help learners understand that:

- Logical reasoning requires careful reading and thinking.
- Breaking the problem into smaller steps makes it easier to solve.
- Using elimination helps identify the correct answer.

Reinforce

Logical thinking helps learners solve problems efficiently in both mathematics and real-life situations.

Concept 2.4: Odd One Out (LB Pages 32–33)

Teaching Intent

To help learners develop classification, logical reasoning, and analytical thinking skills by identifying items that do not belong to a group.

In this concept, learners observe groups of numbers and words and determine which item differs from the rest based on a specific rule or pattern. These activities encourage learners to analyse similarities and differences, recognise patterns, and organise information logically.

Such exercises strengthen decision-making, reasoning ability, and pattern recognition, which are important foundations for computational thinking and coding.

Concept Explanation

An "Odd One Out" activity involves identifying the item that is different from the others in a group.

The difference may be based on:

- number patterns
- mathematical rules
- categories of objects
- meanings of words
- characteristics or properties

To find the odd one out, learners must:

1. Observe the items carefully.
2. Identify the common rule or relationship between most of the items.
3. Find the item that does not follow the same rule.

This process helps learners develop critical thinking and logical analysis skills.

⇨ Activity A: Identify the Odd Number

Teacher Instructions

- Ask learners to observe each row of numbers carefully.
- Explain that most numbers in the row follow a particular pattern or rule.
- Tell learners to identify the number that does not follow the pattern.
- Ask them to circle the number that is different from the others.

Teacher–Learner Interaction

Ask guiding questions such as:

- Do the numbers follow a specific pattern such as multiples or sequences?
- Which number does not match the rule?
- Are the numbers increasing or decreasing in a particular order?
- Which number breaks the pattern?

Encourage learners to analyse the sequence step by step.

Teacher Guidance

Help learners understand that:

- Patterns help organise numbers logically.
- Identifying the rule makes it easier to detect the number that does not belong.
- Careful observation prevents mistakes.

Reinforce

Recognising number patterns strengthens logical reasoning skills.

⇨ Activity B: Identify the Odd Word

Teacher Instructions

- Ask learners to read each group of words carefully.
- Explain that most words in the group belong to the same category.
- Tell learners to identify the word that does not belong to that category.
- Ask learners to circle the odd word.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which items belong to the same category?
- Which word represents something different from the others?
- Are the words related to objects, professions, seasons, or numbers?
- Which word does not fit with the rest?

Encourage learners to explain why a word is different.

Teacher Guidance

Help learners understand that:

- Words can be grouped according to their category or meaning.
- The odd word does not belong to the same group as the others.
- Analysing similarities helps identify the different item.

Reinforce

Classifying objects and ideas helps learners organise information logically.

Concept 2.5: Wonderful Sudoku (LB Pages 34–37)

Teaching Intent

To help learners develop logical reasoning, pattern recognition, and problem-solving skills through Sudoku puzzles.

In this concept, learners learn how to complete Sudoku grids by following specific rules. They analyse rows, columns, and smaller boxes to identify missing numbers or letters. This activity encourages learners to observe patterns, eliminate incorrect possibilities, and think logically step by step.

Sudoku strengthens analytical thinking, concentration, and decision-making skills, which are important foundations for computational thinking and coding.

Concept Explanation

Sudoku is a puzzle in which a grid must be filled with numbers or letters according to certain rules.

In this lesson, learners work with 4 × 4 Sudoku grids.

The rules are:

- Each row must contain the numbers 1 to 4 exactly once.
- Each column must contain the numbers 1 to 4 exactly once.
- Each 2 × 2 box must contain the numbers 1 to 4 exactly once.

By observing the numbers already given in the grid, learners can determine the missing numbers logically.

Sometimes Sudoku puzzles may use letters instead of numbers, but the rules remain the same.

➪ Activity A: Solve the Sudoku with Numbers

Teacher Instructions

- Ask learners to observe the Sudoku grid carefully.
- Explain that some numbers are already given.
- Remind learners that each row, column, and 2×2 box must contain numbers 1 to 4 only once.
- Encourage learners to find the missing numbers step by step.
- Ask learners to write the correct number in each empty box.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which number is missing in the first row?
- Does the column already contain that number?
- What numbers are present in the 2×2 box?
- Which number can be placed without repeating?

Encourage learners to check all three conditions:

- Row
- Column
- Box

before filling a number.

Teacher Guidance

Help learners understand that:

- Sudoku puzzles require logical thinking rather than guessing.
- Checking rows, columns, and boxes helps identify the correct number.
- Solving step by step prevents mistakes.

Reinforce

Logical reasoning helps learners solve puzzles efficiently.

➪ Activity B: Solve the Sudoku with Letters

Teacher Instructions

- Ask learners to observe the Sudoku grid containing letters.

- Explain that the letters E, F, G, and H must appear once in each row, column, and box.
- Tell learners to identify the missing letters logically.
- Ask learners to fill in the empty spaces accordingly.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which letters are already present in the row?
- Which letter is missing from the column?
- What letters appear in the 2×2 box?
- Which letter fits without repeating?

Encourage learners to eliminate letters that are already present.

Teacher Guidance

Help learners understand that:

- Sudoku rules remain the same whether using numbers or letters.
- Careful observation helps identify missing elements.
- Logical elimination helps determine the correct answer.

Reinforce

Sudoku puzzles strengthen reasoning and analytical thinking.

Coding Challenge - 2: Overlook and Recall (LB Page 38)

Teaching Intent

To help learners strengthen their observation, memory, and analytical thinking skills by carefully studying a set of pictures and words and recalling them after a short time. In this activity, learners observe the given images and information for a limited period and then try to remember as many items as possible.

This activity develops learners' concentration, visual memory, and attention to detail, which are important abilities for computational thinking and problem solving.

Activity: Observe and Recall

Teacher Instructions

- Ask learners to carefully observe the pictures and words shown in the activity.
- Explain that they will have two minutes to look at the images and information.
- Tell learners to pay close attention to the objects, words, and details shown.
- After the observation time is over, ask learners to close the book or cover the page.

- Ask them to recall and write down the items they remember.
- Encourage learners to think carefully and try to remember as many items as possible.

Teacher–Learner Interaction

Ask guiding questions such as:

- What objects or words did you notice in the picture?
-
- Which items were easy to remember?
- Did you observe any colours, shapes, or patterns that helped you remember the items?
- How can careful observation help you recall more information?

Encourage learners to describe what they remember before writing their answers.

Teacher Guidance

Encourage learners to:

- Observe the picture carefully during the given time.
- Focus on important details such as shapes, colours, and positions of objects.
- Try to remember the items by grouping them mentally.
- Recall the items calmly and write them down carefully.

Reinforce

Observation and memory are important thinking skills. In coding and computing, remembering instructions and analysing information carefully helps us solve problems effectively.

Review Exercise

1. Why is careful observation important when solving puzzles?
2. What strategies can help you remember information more easily?
3. How does concentration help improve memory?
4. Why is recalling information an important skill in problem solving?

Differentiated Lessons

Remedial Activity

- Show learners a simple picture with a few objects.
- Give them one minute to observe it and then ask them to recall the objects they remember.

Challenging Activity

- Show a picture with many objects for a short time.
- Ask learners to recall and list as many items as possible without looking again.

Teacher Closure for Level 2

Summarise the key learning points:

Learners have learned to:

- Observe pictures and details carefully
- Improve memory and recall skills
- Analyse visual information
- Recognise patterns and relationships
- Apply concentration while solving tasks

These activities help learners develop analytical thinking, observation, and memory skills, which support computational thinking and logical problem solving.

Level 3 Data Processing

Data processing activities help learners develop skills in organising, analysing, and interpreting information. These activities strengthen learners' ability to observe data carefully, recognise patterns, and draw logical conclusions. Such skills are essential for computational thinking and form an important foundation for understanding how computers process information.

In this level, learners engage with interesting activities that involve reading graphs, arranging data, identifying symbols, interpreting pictographs, and decoding hidden messages. These activities encourage learners to observe visual information carefully, compare values, and apply logical reasoning to understand the information presented.

Through these activities, learners begin to understand that information can be represented in different forms such as graphs, symbols, and coded patterns, and that analysing these representations helps solve problems efficiently. This understanding prepares learners for future coding concepts where data is often organised and processed using logical rules.

Concept 3.1: Ascending and Descending

(LB Pages 40–42)

Teaching Intent

To help learners understand how numbers can be arranged in order from smallest to largest and from largest to smallest. This activity strengthens learners' ability to compare numbers and organise information logically.

Through these exercises, learners practise identifying number order, recognising numerical patterns, and arranging numbers systematically. These skills help learners develop logical thinking and data organisation abilities, which are important for understanding how computers sort and process information.

Concept Explanation

Numbers can be arranged in different ways depending on the required order.

Ascending order means arranging numbers from the smallest number to the largest number.

For example:

3, 5, 7, 9, 11

Descending order means arranging numbers from the largest number to the smallest number.

For example:

11, 9, 7, 5, 3

Understanding ascending and descending order helps learners organise numbers clearly and compare values easily.

⇨ Activity A: Arrange the Numbers in Ascending Order

Teacher Instructions

- Ask learners to read the numbers given in each row carefully.
- Explain that ascending order means arranging numbers from smallest to largest.
- Encourage learners to compare the numbers and identify the smallest number first.
- Ask them to write the numbers in the correct ascending order.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which number is the smallest in this list?
- Which number comes next after it?
- Which number is the largest?
- How can we arrange these numbers from smallest to largest?

Encourage learners to check their answers after arranging the numbers.

Teacher Guidance

Help learners understand that:

- Comparing numbers helps determine their order.
- Identifying the smallest number first makes it easier to arrange numbers correctly.

Reinforce

Arranging numbers in ascending order helps organise data clearly.

⇨ Activity B: Arrange the Numbers in Descending Order

Teacher Instructions

- Ask learners to observe the numbers given in each row.
- Explain that descending order means arranging numbers from largest to smallest.
- Tell learners to identify the largest number first.
- Ask them to write the numbers in descending order.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which number is the largest?

- Which number comes just below it?
- Which number is the smallest in the group?

Encourage learners to double-check that the numbers decrease from left to right.

Teacher Guidance

Help learners understand that:

- Descending order arranges numbers from biggest to smallest.
- Careful comparison helps avoid mistakes.

Reinforce

Descending order is often used when ranking or listing items by value.

➪ Activity C: Count and Write – 6 More

Teacher Instructions

- Ask learners to observe the numbers given in the table.
- Explain that they must write the number that is 6 more than the given number.
- Encourage learners to add 6 to each number carefully.
- After completing the additions, ask learners to arrange the resulting numbers in descending order.

Teacher–Learner Interaction

Ask guiding questions such as:

- What is 6 more than 18?
- What is 6 more than 33?
- Which number becomes the largest after adding 6?

Encourage learners to verify their answers before arranging them.

Teacher Guidance

Help learners understand that:

- Adding 6 increases the value of each number.
- After calculating, the numbers must be compared and arranged correctly.

Reinforce

Performing calculations and organising results helps develop logical thinking.

Concept 3.2: Pie Chart (LB Page 43)

Teaching Intent

To help learners understand how information or data can be represented using a pie chart. This activity helps learners observe visual data, compare quantities, and interpret information presented in a circular chart.

Through this concept, learners practise identifying the largest and smallest sections of a chart and comparing different categories. These activities strengthen learners' data interpretation, observation, and analytical thinking skills, which are important for understanding how information is organised and analysed.

Concept Explanation

A pie chart is a circular chart used to represent data. It is divided into different sections called slices.

Each slice of the pie represents a part of the whole data. The size of the slice shows the relative size or proportion of that category compared to others.

For example, in the given pie chart, Araba's friends voted for their favourite hobbies such as:

- Reading
- Singing
- Dancing
- Painting

The larger slice represents a hobby chosen by more students, while the smaller slice represents a hobby chosen by fewer students.

⇨ Activity A: Study the Pie Chart and Answer the Questions

Teacher Instructions

- Ask learners to observe the pie chart carefully.
- Explain that each section of the pie represents a hobby.
- Tell learners to compare the sizes of the slices.
- Ask them to answer the questions based on their observations.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which slice of the pie chart is the largest?
- Which slice is the smallest?
- Which hobbies appear to have the same size slices?
- Which hobby received more votes between two given options?

Encourage learners to compare the slices visually before answering.

Teacher Guidance

Help learners understand that:

- Larger slices represent more votes or higher values.
- Smaller slices represent fewer votes or smaller values.
- Equal slices represent the same number of votes.

Reinforce

Pie charts help us understand and compare information quickly.

Concept 3.3: Binary Code

(LB Pages 44–48)

Teaching Intent

To introduce learners to the concept of binary code, which is the basic language used by computers and digital devices. This activity helps learners understand how pictures and information can be represented using only two numbers: 0 and 1.

Through these activities, learners practise identifying coloured and non-coloured boxes in a grid and representing them using binary numbers. These exercises strengthen learners' pattern recognition, logical thinking, and data representation skills, which are essential for understanding how computers process information.

Concept Explanation

Binary code is a system used by computers to represent information using only two numbers: 0 and 1.

This system is called a binary number system because it has only two possible states:

- 0 represents an OFF state or an empty box.
- 1 represents an ON state or a coloured box.

Computers use binary code to store and process information such as images, text, and numbers.

In the activity shown, coloured boxes represent 1, while uncoloured boxes represent 0. By writing the pattern of 0s and 1s for each row, a picture can be created or decoded.

Activity A: Create Binary Codes for the Images

Teacher Instructions

- Ask learners to observe the grid images carefully.
- Explain that coloured boxes represent 1 and blank boxes represent 0.
- Tell learners to read the grid row by row.
- Ask them to write the corresponding sequence of 0s and 1s in the space provided.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which boxes in the row are coloured?
- How many coloured boxes are there in this row?
- What number represents a coloured box?
- What number represents a blank box?

Encourage learners to read each row carefully before writing the binary code.

Teacher Guidance

Help learners understand that:

- Each row of the grid forms a sequence of binary numbers.
- Writing the correct sequence of 0s and 1s helps represent the image accurately.

Reinforce

Binary numbers are the foundation of how computers store images and information.

➪ Activity B: Write Binary Codes for the Given Images

Teacher Instructions

- Ask learners to observe each image made using coloured boxes.
- Explain that they must convert the pattern into binary code.
- Tell learners to read the grid row by row and write the sequence of 0s and 1s.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which boxes in the row are coloured?
- Which boxes are blank?
- What sequence of numbers represents this row?

Encourage learners to check their answers after completing each row.

Teacher Guidance

Help learners understand that:

- Careful observation is important while writing binary codes.
- Each coloured box must be represented correctly.

Reinforce

Binary coding is used by computers to represent images and digital information.

Activity C: Colour the Boxes

Teacher Instructions

- Ask learners to observe the grid containing numbers 0 and 1.
- Explain that boxes containing 1 should be coloured.
- Tell learners to leave boxes containing 0 uncoloured.
- Encourage learners to colour the boxes carefully.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which number tells us to colour the box?
- Which number means the box remains blank?
- What picture appears after colouring the boxes?

Encourage learners to observe the final image formed.

Teacher Guidance

Help learners understand that:

- Binary codes can be used to create images.
- Following the pattern carefully produces the correct picture.

Reinforce

Binary patterns are widely used in computers to represent images and graphics

Concept 3.4: Data Compression (LB Pages 49–51)

Teaching Intent

To help learners understand the concept of data compression, which means representing information in a shorter or simplified form. This activity introduces learners to the idea that long information can be reduced into a compact format using symbols or abbreviations.

Through these activities, learners practise identifying common abbreviations and decoding compressed messages. These exercises help develop learners' logical thinking, pattern recognition, and information processing skills, which are important for understanding how computers store and transmit data efficiently.

Concept Explanation

Compression means making something smaller. In data processing, compression refers to reducing the size of information by representing it in a shorter form.

For example:

Instead of writing

AAAAAGGGGGGBBBBFFFFFF

we can write it in compressed form as:

5A6G4B6F

This method reduces the amount of space needed to store information.

Another common form of compression is abbreviation.

An abbreviation is a shortened form of a word or phrase. Abbreviations help make communication faster and more efficient.

Examples of common abbreviations include:

- BRB – Be Right Back
- DOB – Date of Birth
- ASAP – As Soon As Possible
- WWW – World Wide Web
- DIY – Do It Yourself
- LOL – Laughing Out Loud

Abbreviations are widely used in digital communication, messaging, and computing.

Activity A: Match the Abbreviations

Teacher Instructions

- Ask learners to observe the list of abbreviations carefully.
- Explain that each abbreviation represents a longer phrase or word.
- Tell learners to match each abbreviation with its correct meaning.
- Encourage learners to draw lines connecting the correct pairs.

Teacher–Learner Interaction

Ask guiding questions such as:

- What does the abbreviation ASAP stand for?
- Have you seen abbreviations used in text messages?
- Why do people use abbreviations?

Encourage learners to read both columns carefully before matching.

Teacher Guidance

Help learners understand that:

- Abbreviations make communication quicker.
- Many abbreviations are commonly used in everyday digital communication.

Reinforce

Short forms help reduce the length of information.

➪ Activity B: Decode the Compressed Story

Teacher Instructions

- Ask learners to observe the story carefully.
- Explain that some words are replaced by pictures.
- Tell learners to identify what each picture represents.
- Ask them to rewrite the story by replacing pictures with the correct words.

Teacher–Learner Interaction

Ask guiding questions such as:

- What animal is shown in the picture?
- What object does this picture represent?
- How can we replace the pictures with words to complete the story?

Encourage learners to read the completed story aloud.

Teacher Guidance

Help learners understand that:

- Pictures can represent words in compressed messages.
- Decoding helps convert compressed information into a full message.

Reinforce

Decoding information helps us understand hidden or shortened messages.

Coding Challenge – 3: Addition Maze (LB Page 52)

Teaching Intent

To help learners apply their addition and logical reasoning skills by solving mathematical problems while navigating through a maze. In this activity, learners follow a path by solving addition problems and choosing the route that shows the correct answer.

This activity strengthens learners' numerical reasoning, problem-solving ability, and decision-making skills, which are important components of computational thinking.

➪ Activity: Find the Correct Path in the Maze

Teacher Instructions

- Ask learners to carefully observe the maze shown in the activity.
- Explain that the maze contains several addition problems along different paths.

- Tell learners that they must start from the entrance of the maze.
- Ask them to solve the addition problem shown at each step.
- After solving the problem, learners should follow the path that shows the correct answer. Encourage learners to continue solving the problems until they reach the pot of gold at the end of the maze.
- Remind learners to check their calculations carefully before choosing the path.

Teacher–Learner Interaction

Ask guiding questions such as:

- Where does the maze begin?
- What must you do before choosing a path?
- Which path should you follow after solving the addition problem?
- What happens if the answer is incorrect?

Encourage learners to explain their thinking while choosing the correct path.

Teacher Guidance

Encourage learners to:

- Solve each addition problem carefully before moving forward.
- Check their answers before selecting the path.
- Work step by step and avoid guessing the route.
- Trace their path slowly through the maze.

Reinforce

Solving problems step by step helps us reach the correct solution. In coding and computing, similar logical steps help computers process instructions and solve tasks efficiently.

Review Exercise

1. Why is it important to solve the addition problem before choosing a path?
2. How can checking your answer help you avoid mistakes in the maze?
3. What strategy can help you complete the maze successfully?
4. How does solving a maze improve problem-solving skills?

Differentiated Lessons

Remedial Activity

- Provide learners with simple addition problems.
- Ask them to practise solving the problems before attempting the maze activity.

Challenging Activity

- Ask learners to design their own addition maze using numbers and different paths.
- Let their classmates solve the maze they created.

Teacher Closure for Level 3

Summarise the key learning points:

Learners have learned to:

- Solve addition problems accurately
- Follow logical steps to reach a solution
- Analyse and choose the correct path
- Apply reasoning while solving puzzles
- Develop problem-solving strategies

These activities help learners develop numerical reasoning, analytical thinking, and logical decision-making skills, which are essential for computational thinking and early coding concepts.

4 Level Algorithmic Intelligence

Algorithmic Intelligence activities help learners develop the ability to think logically, follow step-by-step instructions, and solve problems systematically. These activities introduce learners to important programming concepts such as algorithms, conditions, and loops, which are fundamental to how computers perform tasks.

In this level, learners engage with activities that require them to complete algorithms, analyse conditional statements, and follow repeated instructions using loops. These activities encourage learners to break tasks into smaller steps, understand decision-making processes, and recognise repeated patterns in instructions.

Through these activities, learners begin to understand that computers solve problems by following clear instructions, making decisions based on conditions, and repeating tasks when necessary. This understanding strengthens learners' computational thinking, logical reasoning, and problem-solving skills, which are essential for learning coding and programming.

Concept 4.1: Algorithm

(LB Pages 54–56)

Teaching Intent

To introduce learners to the concept of an algorithm, which is a set of step-by-step instructions used to complete a task or solve a problem. This activity helps learners understand that many tasks can be completed by following a clear sequence of steps.

Through these activities, learners practise arranging and completing steps in the correct order. These exercises strengthen learners' logical thinking, sequencing ability, and problem-solving skills, which are important foundations for learning coding and programming.

Concept Explanation

An algorithm is a set of instructions given in a step-by-step order to solve a problem or perform a task.

Algorithms are used in everyday life. For example:

- following a recipe to cook food
- solving a mathematical problem
- operating a machine
- writing a computer program

In coding, algorithms help computers understand what steps to follow and in what order.

A good algorithm should be:

- clear
- simple
- arranged in the correct sequence

⇨ Activity A: Complete the Algorithm

Teacher Instructions

- Ask learners to read the steps given in the algorithm carefully.
- Explain that some steps are incomplete.
- Tell learners to fill in the missing words to complete the algorithm correctly.
- Encourage learners to think about the correct sequence of actions required to buy a pen.

Teacher–Learner Interaction

Ask guiding questions such as:

- What do we do after reaching the stationery shop?
- Who do we ask for the price of an item?
- What must we pay before taking the item?

Encourage learners to read the completed steps aloud.

Teacher Guidance

Help learners understand that:

- Each step in an algorithm must follow a logical sequence.
- Missing steps can make the process incomplete.

Reinforce

Algorithms help us perform tasks in an organised way.

⇨ Activity B: Algorithm for Addition and Multiplication

Teacher Instructions

- Ask learners to read the steps of the algorithm carefully.
- Explain that the algorithm first calculates the **sum** and then the **product** of two numbers.
- Tell learners to fill in the missing values using the given numbers.

Teacher–Learner Interaction

Ask guiding questions such as:

- What happens when we add the two numbers?
- What happens when we multiply the two numbers?
- What values should be displayed as outputs?

Encourage learners to follow each step carefully.

Teacher Guidance

Help learners understand that:

- Algorithms break complex problems into smaller steps.
- Following the steps carefully helps obtain the correct result.

Reinforce

Computers follow algorithms to perform calculations.

Activity C: Algorithm to Prepare Tea

Teacher Instructions

- Ask learners to read the algorithm carefully.
- Provide the help box containing words to complete the steps.
- Tell learners to fill in the blanks to complete the algorithm for preparing tea.

Teacher–Learner Interaction

Ask guiding questions such as:

- What do we need to boil water?
- When do we add tea leaves?
- When should we turn off the gas?

Encourage learners to think about the correct order of steps.

Teacher Guidance

Help learners understand that:

- Many daily activities can be written as algorithms.
- Correct sequencing is important for completing tasks successfully.

Reinforce

Algorithms are used in computers to perform tasks automatically.

Concept 4.2: Programs: Conditions (LB Pages 57–59)

Teaching Intent

To introduce learners to the concept of conditions in programming, where decisions are made based on certain situations. This activity helps learners understand how computers choose between different actions depending on whether a condition is true or false.

Through these activities, learners practise completing conditional statements and predicting outcomes based on given situations. These exercises strengthen learners' logical reasoning, decision-making, and problem-solving skills, which are essential for understanding programming and coding.

Concept Explanation

A condition is used when a decision must be made based on a particular situation.

Computers use If–Else statements to make decisions.

- If a condition is true, the computer performs one action.
- If a condition is false, the computer performs a different action.

For example:

If you are hungry

Then eat food

Else do not eat food

Another example:

If it is sports period

Then go to the playground

Else study in the classroom

This structure helps computers decide which action to perform depending on the situation.

Activity A: Complete the Conditional Program

Teacher Instructions

- Ask learners to read the conditional program carefully.
- Explain that the program checks whether a child passes or fails based on the marks obtained.
- Tell learners to fill in the missing parts of the program.

Teacher–Learner Interaction

Ask guiding questions such as:

- What are the passing marks given in the question?
- What happens if the marks obtained are greater than the passing marks?
- What should be displayed if the marks are less?

Encourage learners to think about the correct outcome.

Teacher Guidance

Help learners understand that:

- A condition checks whether something is true or false.
- The program follows different actions depending on the result.

Reinforce

Conditional statements help computers make decisions.

Activity B: Complete the Conditional Statements

Teacher Instructions

- Ask learners to read each situation carefully.
- Tell learners to complete the sentence logically using "then".
- Encourage them to think about what normally happens in each situation.

Teacher–Learner Interaction

Ask guiding questions such as:

- What happens if we eat vegetables?
- What do people do when it rains?
- What should we do if the phone battery is low?

Encourage learners to think about realistic answers.

Teacher Guidance

Help learners understand that:

- Conditional thinking helps predict outcomes.
- Many real-life situations involve decision making.

Reinforce

Programming uses similar decision-making logic.

⇨ Activity C: Apply Conditions Using Numbers

Teacher Instructions

- Ask learners to observe the numbers in the grid.
- Explain the rules given in the activity:
  If a number is divisible by 2, colour the box red.
  If a number is divisible by 3, colour the box blue.
- Tell learners to check each number and apply the correct rule.

Teacher–Learner Interaction

Ask guiding questions such as:

- Which numbers are divisible by 2?
- Which numbers are divisible by 3?
- Can a number be divisible by both?

Encourage learners to check the numbers carefully.

Teacher Guidance

Help learners understand that:

- Conditions can also be used with numbers.
- Mathematical rules help determine the correct outcome.

Reinforce

Computers use conditions to perform different tasks automatically

Concept 4.3: Programs: Loops (LB Pages 60–62)

Teaching Intent

To introduce learners to the concept of a loop, which allows a set of instructions to be repeated multiple times. This concept helps learners understand how repeating actions can be simplified using loops in programming.

Through these activities, learners practise following repeated instructions to colour shapes and complete patterns. These exercises strengthen learners' logical thinking, pattern recognition, and sequencing skills, which are essential for understanding coding and programming.

Concept Explanation

A loop is a set of instructions that are repeated again and again until a specific condition is met.

In programming, loops help perform repetitive tasks efficiently. Instead of writing the same instruction many times, a loop allows the instruction to be repeated automatically.

For example:

Without a loop:

- Move 1 box down
- Move 1 box down
- Move 1 box down
- Move 1 box down
- Move 1 box down

With a loop:

Repeat 5 times

(Move 1 box down)

Both sets of instructions perform the same task, but the loop makes the program shorter and easier to understand.

Loops are widely used in computer programs to repeat tasks quickly and efficiently.

Activity A: Follow the Given Programs

Teaching Intent

To help learners understand how repeated instructions work in a program.

Teacher Instructions

- Ask learners to read the given program carefully.
- Explain the meaning of the word repeat in programming instructions.
- Tell learners to follow the instructions step by step.
- Ask them to colour the shapes or move across the grid according to the program.

Teacher–Learner Interaction

Ask guiding questions such as:

- What does "repeat 2 times" mean?
- Which instruction should be followed first?
- After completing the instructions once, what should happen next?

Encourage learners to read each instruction carefully before colouring or moving.

Teacher Guidance

Help learners understand that:

- A loop repeats the same instructions several times.
- Repetition helps complete tasks faster.

Reinforce

Loops make programs shorter and easier to manage.

➪ Activity B: Colour the Stairs Using the Loop

Teacher Instructions

- Ask learners to read the given program carefully.
- Explain the instructions provided inside the loop.
- Tell learners to repeat the steps the required number of times.
- Ask them to colour the steps according to the instructions.

Teacher–Learner Interaction

Ask guiding questions such as:

- How many times should the loop repeat?
- What colour should be used first?
- After colouring, which direction should we move?

Encourage learners to check their steps after each repetition.

Teacher Guidance

Help learners understand that:

- Each repetition of the loop performs the same set of actions.
- Following the instructions correctly produces the final pattern.

Reinforce

Loops are useful when the same action needs to be performed many times.

Coding Challenge - 4: Banana Muffin (LB Page 63)

Teaching Intent

To help learners understand the concept of sequencing and algorithmic thinking by arranging steps in the correct order to complete a task. In this activity, learners analyse the steps involved in preparing banana muffins and organise them in a logical sequence.

This activity strengthens learners' logical reasoning, sequencing ability, and step-by-step problem-solving skills, which are essential foundations for understanding algorithms and programming.

⇨ Activity: Arrange the Steps to Make Banana Muffins

Teacher Instructions

- Ask learners to carefully observe the steps shown in the activity.
- Explain that the steps describe how to prepare banana muffins.
- Tell learners that the steps are not in the correct order.
- Ask them to read each step carefully and understand what happens in the cooking process.
- Instruct learners to arrange the steps from 1 to 6 in the correct sequence.
- Encourage learners to think about which step should come first and which should come later.

Teacher–Learner Interaction

Ask guiding questions such as:

- What should be done first when preparing muffins?
- Which ingredients must be mixed before baking?
- When should the batter be poured into the pan?
- What is the final step in preparing the muffins?

Encourage learners to explain their reasoning for placing each step in a particular order.

Teacher Guidance

Encourage learners to:

- Read each instruction carefully before arranging the steps.
- Think about the logical order of preparing food.
- Arrange the steps from beginning to end.
- Check the sequence again to ensure it makes sense.

Reinforce

Following instructions in the correct order is called sequencing. In coding and programming, computers also follow instructions step by step in a specific sequence called an algorithm.

Review Exercise

1. Why is it important to follow steps in the correct order when completing a task?
2. What could happen if the steps are arranged incorrectly?
3. How does sequencing help in solving problems?
4. Where else do we follow step-by-step instructions in daily life?

Differentiated Lessons

Remedial Activity

- Ask learners to arrange simple daily routine steps such as brushing teeth or getting ready for school in the correct order.

Challenging Activity

- Ask learners to write an algorithm for preparing their favourite food or completing a daily task.

Teacher Closure for Level 4

Summarise the key learning points:
Learners have learned to:

- Understand the concept of algorithms
- Arrange steps in a logical sequence
- Follow instructions carefully
- Analyse tasks step by step
- Apply logical reasoning to complete activities

These activities help learners develop algorithmic thinking, sequencing skills, and logical problem-solving abilities, which are fundamental to coding and programming concepts.

Answer Key

1.1 Number Combinations

A. *Use the combination of the given numbers to get a total of 85. Try to make at least six such combinations.*

1.	**50**	**30**	**5**				
2.	**30**	**20**	**20**	**10**	**5**		
3.	**20**	**20**	**10**	**10**	**10**	**10**	**5**
4.	**30**	**30**	**20**	**5**			
5.	**20**	**20**	**20**	**20**	**5**		
6.	**50**	**10**	**10**	**10**	**5**		

B. *Use the combination of the given numbers to get a total of 200. Try to make at least six such combinations.*

1.	**150**	**50**					
2.	**100**	**50**	**50**				
3.	**100**	**50**	**30**	**20**			
4.	**150**	**30**	**10**	**10**			
5.	**100**	**30**	**30**	**30**	**10**		
6.	**50**	**50**	**50**	**50**			

C. *Fill in the blanks by using numbers 5, 10, 15, 20, 25 and 30 to make combinations to get a sum of the numbers given below.*

1. 10 + 5 + 5 = 20

2. 20 + 10 + 5 + 5 = 40

3. 15 + 5 + 10 + 5 = 35

4. 30 + 25 + 10 + 5 = 70

5. 30 + 20 + 20 + 10 = 80

6. 30 + 5 + 5 + 10 = 50

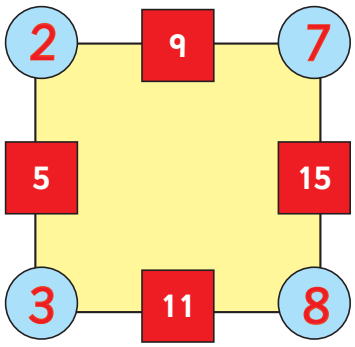
7. 20 + 10 + 10 + 5 = 45

8. 30 + 25 + 15 + 5 = 75

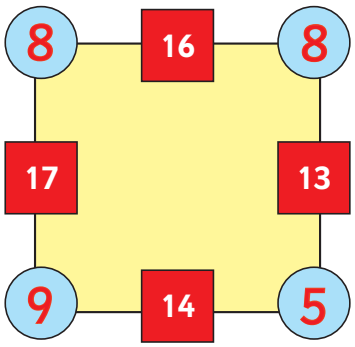
1.2 Arithmagons

A. Solve the arithamagons given below.

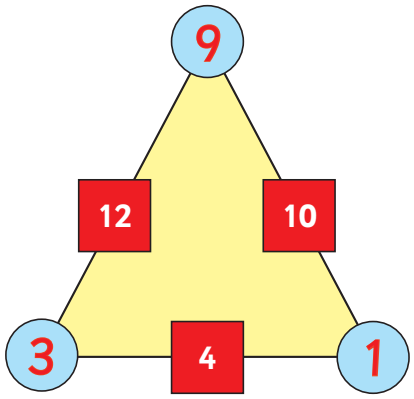
1.



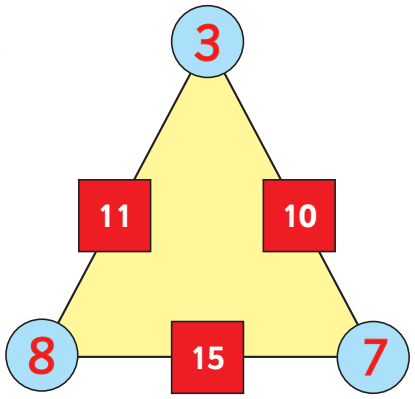
4.



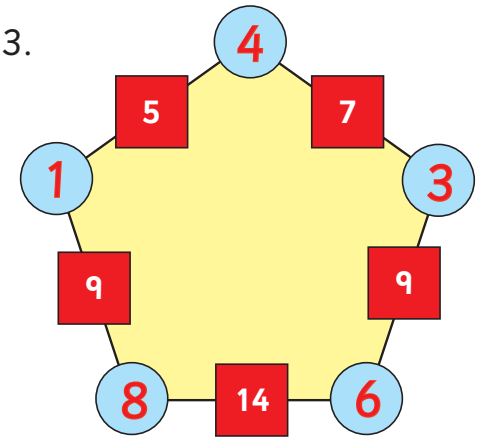
2.



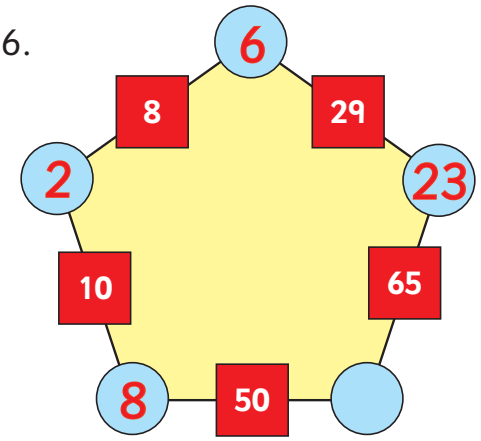
5.



3.

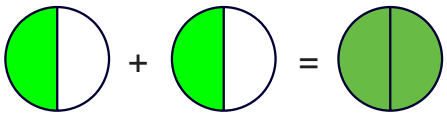


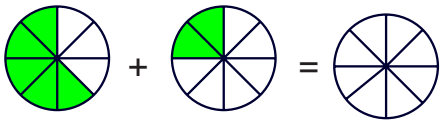
6.

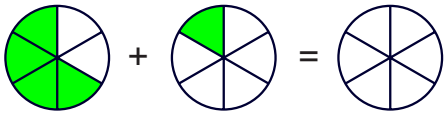


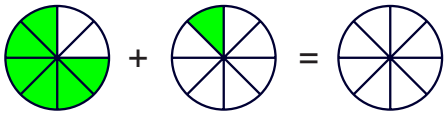
1.3 Graphical Addition

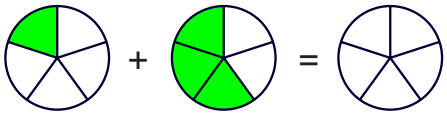
A. Count the coloured pieces and add them and colour the result of the sums in the empty pies. One has been done for you.

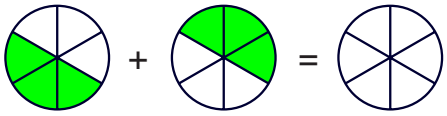
1. 

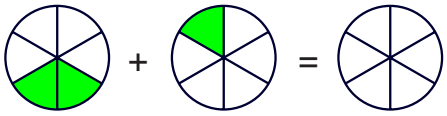
2. 

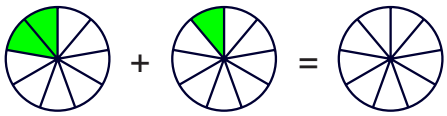
3. 

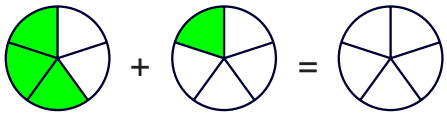
4. 

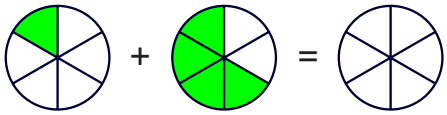
5. 

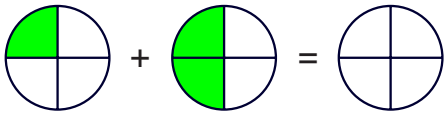
6. 

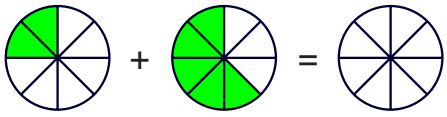
7. 

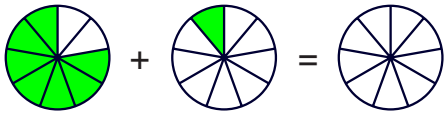
8. 

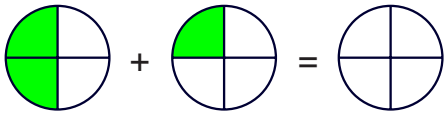
9. 

10. 

11. 

12. 

13. 

14. 

Ans. *Do it yourself.*

1.4 Word Hunt

A. *Search the mentioned words in the word grid given below.*

BRAIN	SCHOOL	HEN
QUEEN	EARTH	SMART
CLASSROOM	HAPPY	LIVE
ANGRY	TULIP	HORSE

Q	H	C	L	B	L	R	S	O
U	T	L	R	L	E	V	I	L
E	H	A	P	P	Y	L	E	E
E	I	S	C	H	O	O	L	S
N	Y	S	T	A	A	N	V	R
R	H	R	M	U	B	M	E	O
H	A	O	G	A	L	E	E	H
E	D	O	C	N	R	I	U	A
D	N	M	A	R	A	T	P	E

B. *Find the following words in the word grid given below.*

FEELING	COMBINATION	OFFICE
THIRSTY	HEAR	HOMEWORK
GROUND	NEIGHBOUR	INTERNET
LOTUS	SOUTH	CODING

N	F	F	W	S	D	N	B	E	A	S
H	O	M	E	W	O	R	K	H	Y	R
E	S	I	R	E	Y	U	A	V	D	N
Y	S	U	T	O	L	H	T	E	T	G
N	T	F	E	A	D	I	E	H	H	S
O	L	S	N	E	N	N	N	O	P	N
I	C	M	R	C	C	I	U	G	T	N
O	L	N	E	I	G	H	B	O	U	R
Z	F	C	T	F	H	R	U	M	R	R
L	A	J	N	F	M	T	A	T	O	G
S	G	L	I	O	G	N	I	D	O	C

1.5 Word Pattern

A. Observe the word pattern and write two more words to complete the chain.





Both	Math	Bath	Path	Oath
Good	Roof	Moon	Noon	Soon
Peel	Feet	Jeep	Keep	Deep
Never	After	Paper	Later	Water
Shirt	Shine	Shout	Share	Shape

1.6 Rhyming Words

A. Write the right answer in the boxes provided. Use the pictures provided as guide.

1. I rhyme with boy. What am I?

   Toy

2. I rhyme with corn. What am I?

   Horn

3. I rhyme with free. What am I?

   Tree

4. I rhyme with boss. What am I?

   Toss

5. I rhyme with bat. What am I?

   Rat

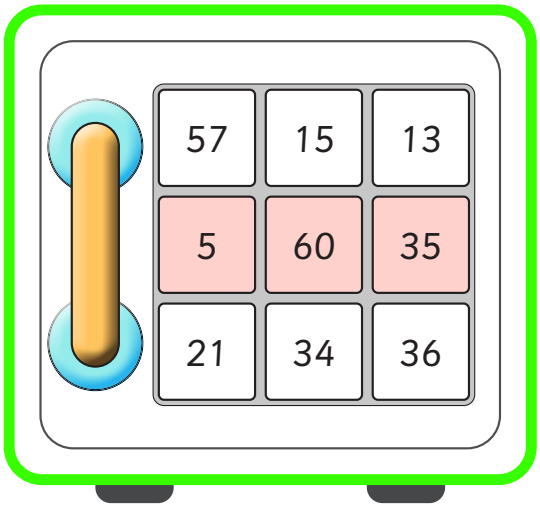
6. I rhyme with men. What am I?

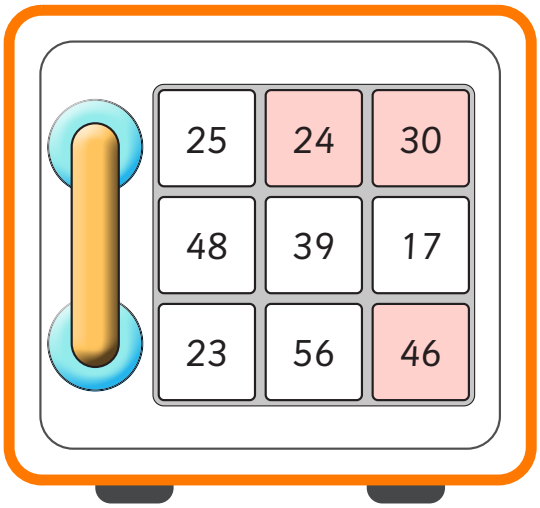
   Pen

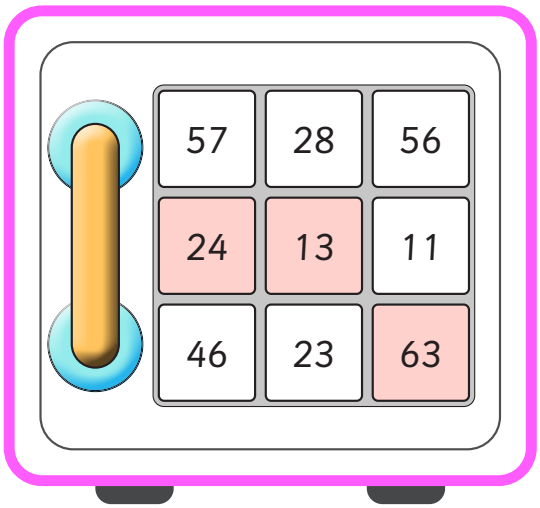
Coding Challenge-1

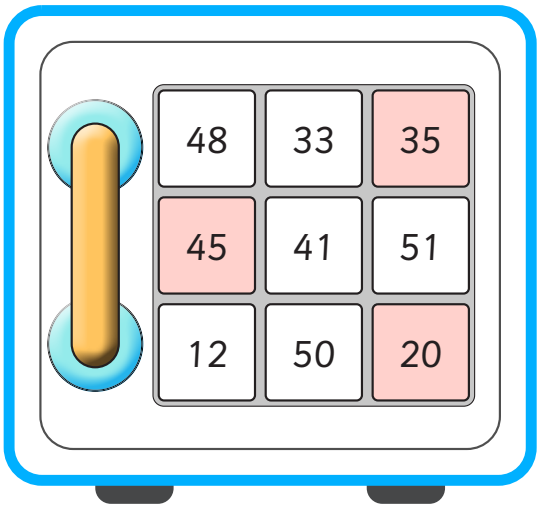
Open the Safe

How to open the safe: You can only press 3 buttons.
The sum of the numbers on the buttons must be exactly 100.
You are not allowed to press a button twice.
Colour the buttons that makes the correct combination.









2.1 Mysterious Pictures

A. *Write the first letter of each picture to make a new word.*

1. 

T A B L E

2. 

S H I N E

3. 

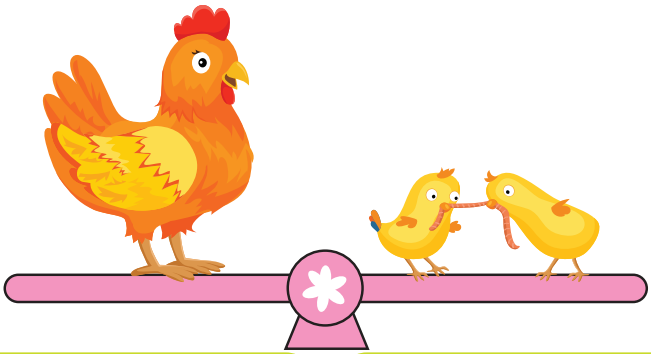
R I C K S H A W

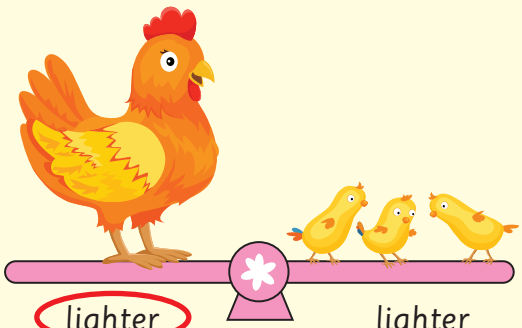
4. 

A E R O P L A N E

B. *Study the picture below of 1 hen and 2 chicks.*

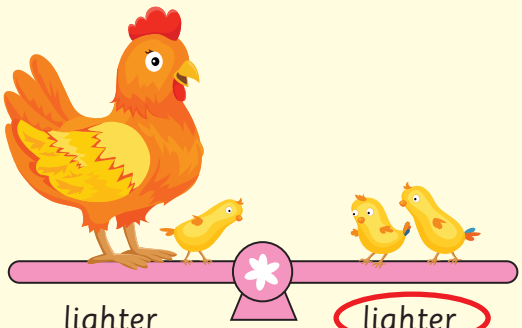
Now, decide in the following pictures which is heavier, lighter or having the same weight.





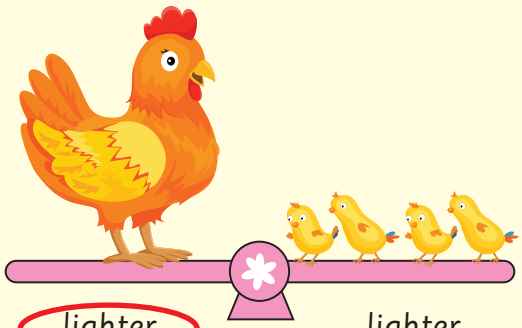
lighter
heavier
same weight

lighter
heavier
same weight



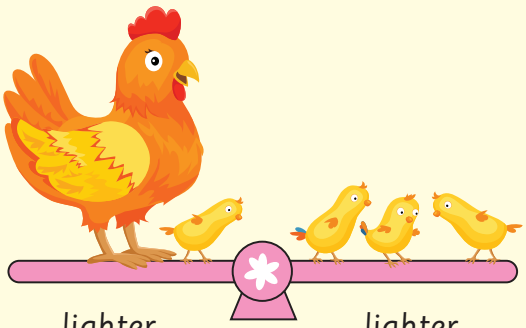
lighter
heavier
same weight

lighter
heavier
same weight



lighter
heavier
same weight

lighter
heavier
same weight



lighter
heavier
same weight

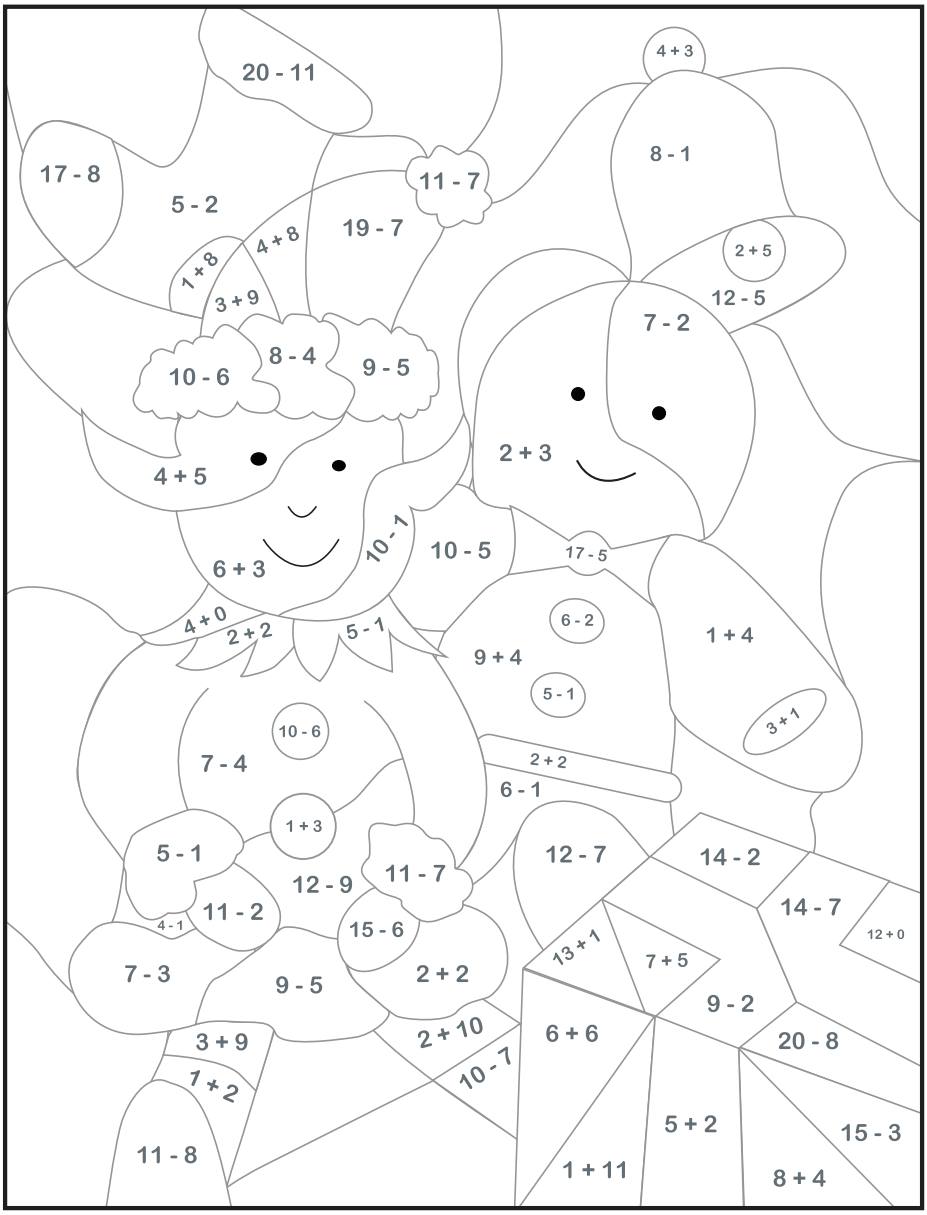
lighter
heavier
same weight

C. *Fill the colours in the picture according to the answers of additions and subtractions.*

Green	3
Yellow	7

Brown	5
Blue	9

Red	12
White	4



Then colour the blank spaces blue.

Ans. *Do it yourself.*

2.2 Symmetrical Images

A. *Find the number of lines of symmetry of the following figures.*

1. 

2

2. 

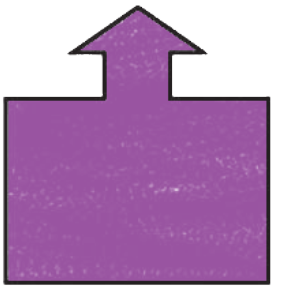
2

3. 

1

4. 

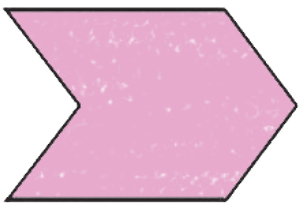
2

5. 

1

6. 

1

7. 

1

8. 

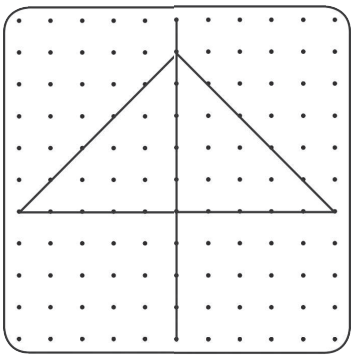
1

9. 

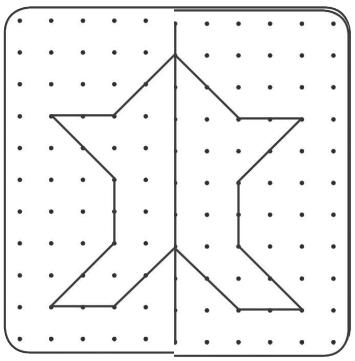
2

B. *Draw the other half of each symmetrical figure.*

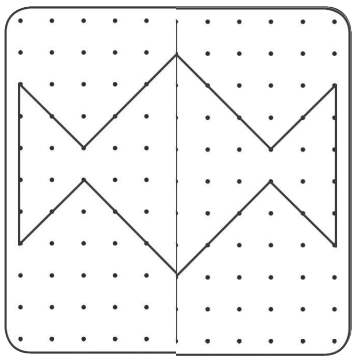
1.



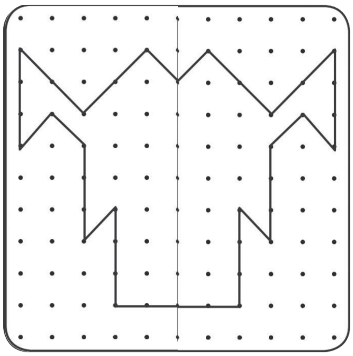
2.



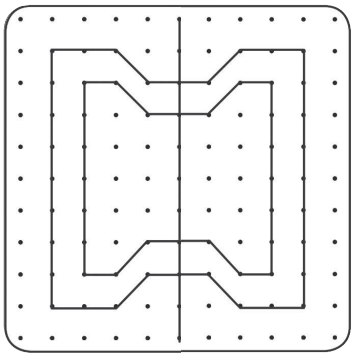
3.



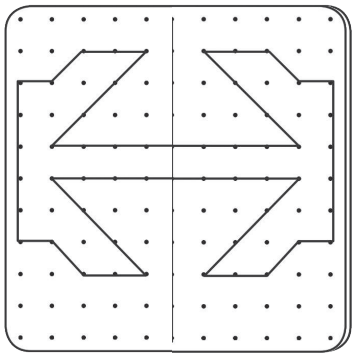
4.



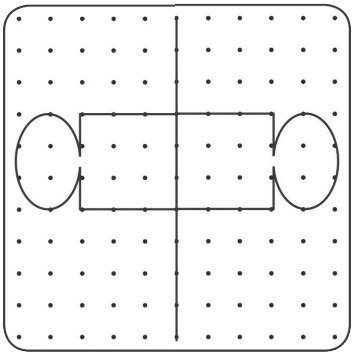
5.



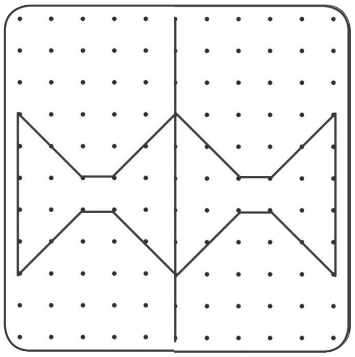
6.



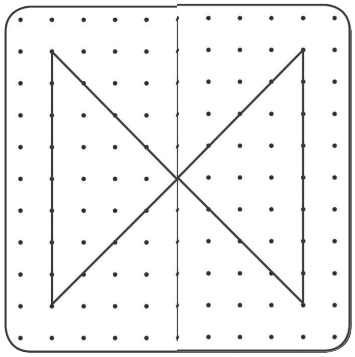
7.



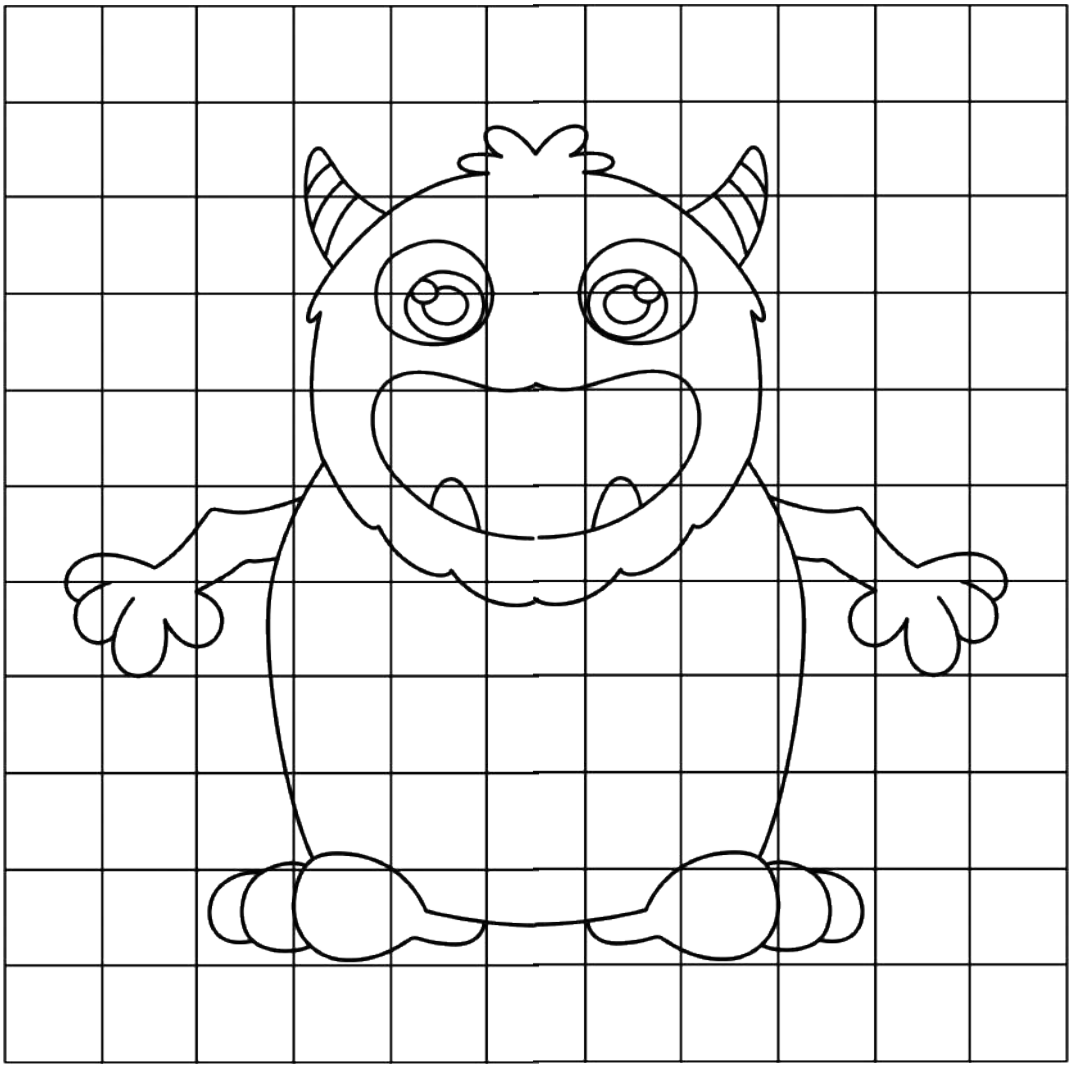
8.



9.



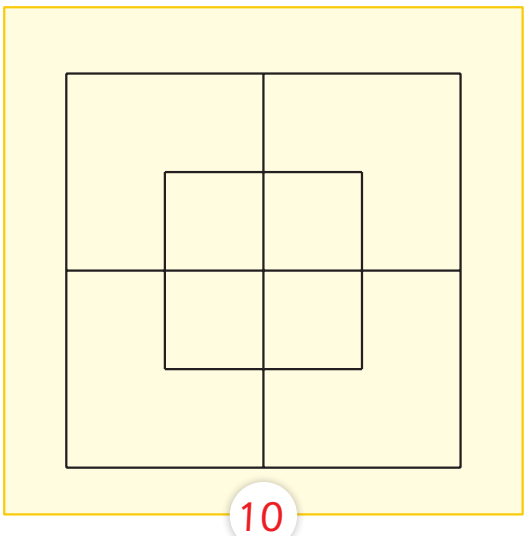
C. *Copy the image and draw the other half of the picture.*



2.3 Logical Analysis

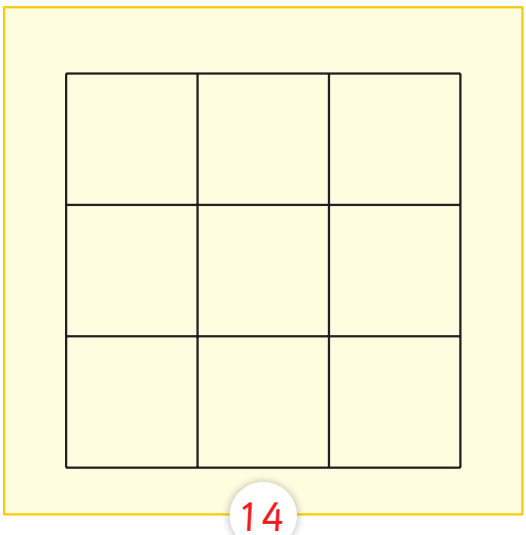
A. How many squares can you find in each picture puzzle?

Puzzle 1



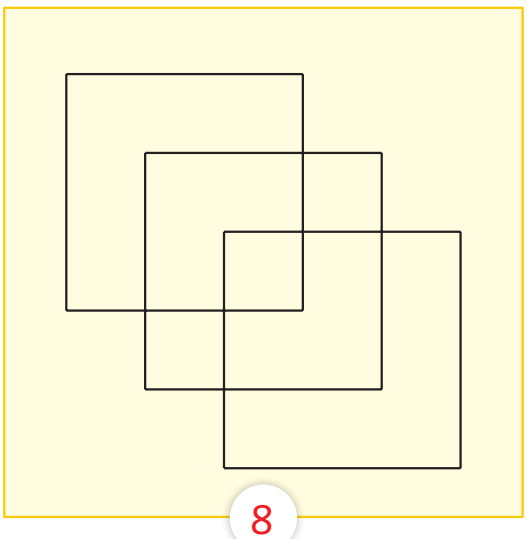
10

Puzzle 2



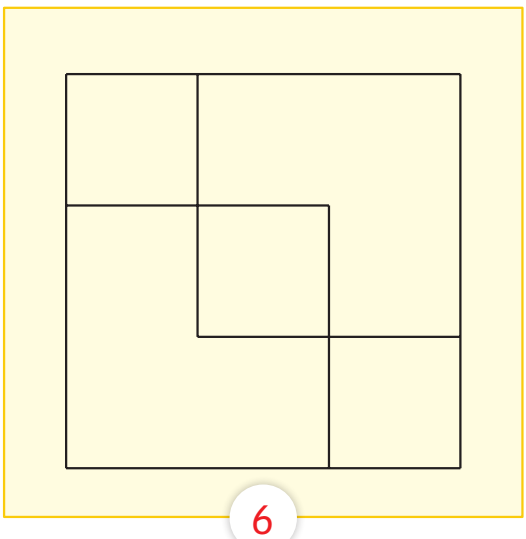
14

Puzzle 3



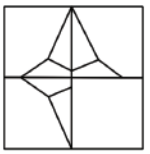
8

Puzzle 4



6

B. *Observe the pattern and identify the figure that completes the picture.*

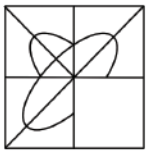
1. 

a. 

b. 

c. 

d. 

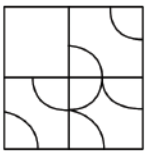
2. 

a. 

b. 

c. 

d. 

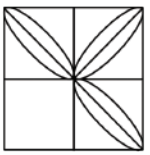
3. 

a. 

b. 

c. 

d. 

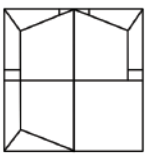
4. 

a. 

b. 

c. 

d. 

5. 

a. 

b. 

c. 

d. 

C. Tick (✓) the correct answer.

1. Ama has 120 candies. She gave 50 candies to her friend Fifi and 30 candies to her friend Afia. How many candies are left with Ama?

a. 30 ☐ b. 50 ☐ c. 40 ✓ d. 120 ☐

2. Kwaku's birthday will come just after the 2nd week of October 2026 and on Monday. Kwaku will celebrate his birthday on _____.

a. 9 ☐ b. 26 ☐

c. 12 ✓ d. 30 ☐

3. The total number of days in a leap year. Which of the following conveys the same meaning?

a. 364 ☐ b. 365 ☐ c. 366 ✓ d. 355 ☐

4. If the word EDUCATION is arranged in alphabetical order, then which letter comes in the sixth place from the left end?

a. N ✓ b. O ☐ c. U ☐ d. T ☐

5 What number will come eighth from the left end if we arrange all of the numbers in the digit 37120869 from biggest to smallest order?

a. 7 ☐ b. 6 ☐ c. 0 ✓ d. 9 ☐

6 In pattern BCD, CDE, DEF,...., what comes next?

a. EFG ✓ b. DEG ☐ c. EGF ☐ d. FED ☐

7 If raincoat is pant, pant is cap, cap is socks, socks is shoes, then Akua uses _____ when it rains.

a. Pant ✓ b. Shoes ☐ c. Raincoat ☐ d. Cap ☐

8 If P = 3, E = 4, A = 5, R = 6 then sum of PEAR is _____.

a. 12 ☐ b. 18 ✓ c. 19 ☐ d. 17 ☐

9 In the word ACHIEVEMENT, which letter comes exactly in the middle?

a. E ☐ b. M ☐ c. V ✓ d. I ☐

10 If x means + then, 7 × 3 × 9 × 4 = _____.

a. 17 ☐ b. 19 ☐ c. 20 ☐ d. 23 ✓

2.4 Odd One Out

A. Circle the odd one out.

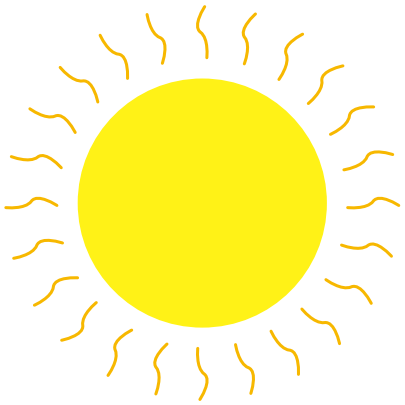
1.	2	4	6	**9**	10
2.	20	40	**65**	80	100
3.	30	32	**35**	36	38
4.	3	7	11	**14**	19
5.	10	8	6	4	**3**
6.	15	20	25	**35**	45
7.	9	18	**28**	36	45
8.	**4–3**	5–2	10–7	7–4	9–6
9.	4+6	5+5	7+3	**8+4**	8+2
10.	0×3	**7×9**	5×0	12×0	0×57

B. Circle the odd one out.

1. Mouse Keyboard CPU **Remote** Monitor
2. Doctor Teacher Nurse **Table** Tailor
3. Sunday **January** Friday Monday Saturday
4. Pen **Television** Book Eraser Pencil
5. **Potato** Pear Apple Peach Banana
6. Stem Leaf Flower **Roof** Root
7. Twelve Seven **White** Six Eight
8. **Shiny** Summer Winter Spring Autumn
9. Bird Animal Insect **Teach** Pets
10. Triangle **Lemon** Square Rectangle Circle

2.5 Wonderful Sudoku

A. Solve the given sudokus having numbers 1 to 4.



3	4	2	1
2	1	3	4
1	3	4	2
4	2	1	3

2	1	4	3
3	4	2	1
1	2	3	4
4	3	1	2

3	2	4	1
4	1	3	2
2	4	1	3
1	3	2	4

B. *Solve the given sudokus having alphabets E to G.*

F	E	G	H
H	G	E	F
G	H	F	E
E	F	H	G

H	E	F	G
G	F	E	H
F	H	G	E
E	G	H	F

G	F	E	H
F	E	H	G
E	H	G	F
H	G	F	E

Coding Challenge-2

Overlook and Recall

Take two minutes to look at the words and pictures below. Then, close the book and see how many you can recall.

Ans. Do it yourself.

3.1 Ascending and Descending

A. *Arrange the following numbers in the ascending order:*

1. 10, 13, 21, 18, 16 : 10, 13, 16, 18, 21,
2. 29, 23, 28, 25, 21 : 21, 23, 25, 28, 29,
3. 67, 60, 69, 62, 63 : 60, 62, 63, 67, 69,
4. 82, 90, 61, 72, 99 : 61, 72, 82, 90, 99,
5. 35, 66, 54, 87, 91 : 35, 54, 66, 87, 91,

B. *Arrange the following numbers in the descending order:*

1.	87	100	98	81	76
	100	98	87	81	76
2.	88	48	28	84	18
	88	84	48	28	18
3.	39	96	62	43	25
	96	62	43	39	25
4.	95	75	55	35	25
	95	75	55	35	25

C. Count and write, 6 more than.

100	106	85	91	22	28
72	78	18	24	48	54
97	103	33	39	29	35
10	16	56	62	70	76
31	37	87	93	89	95
66	72	20	26	30	36
12	18	40	46	43	49
51	57	55	61	9	15
99	105				

Now, arrange the above numbers in descending order, starting from left to right.

106	105	103	95	93
91	78	76	72	62
61	57	54	49	46
39	37	36	35	28
26	24	18	16	15

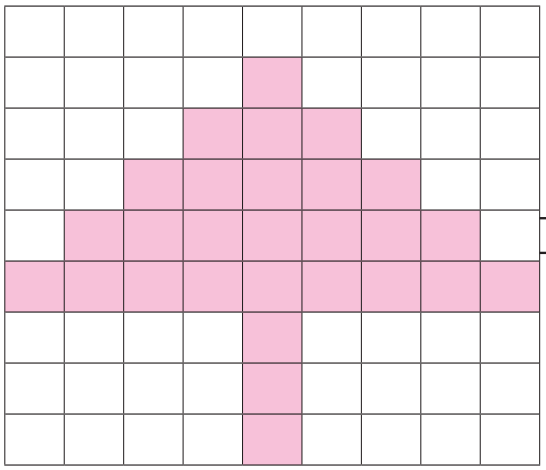
3.2 Pie Chart

A. Araba asked her friends to vote on their favourite hobby.

1. What hobby is liked the most?
   Ans. Reading
2. What hobby is liked the least?
   Ans. Painting
3. What hobbies got the same number of votes?
   Ans. Singing and Dancing
4. What hobby got more votes, reading or painting?
   Ans. Reading
5. What hobby got fewer votes, dancing or reading?
   Ans. Dancing

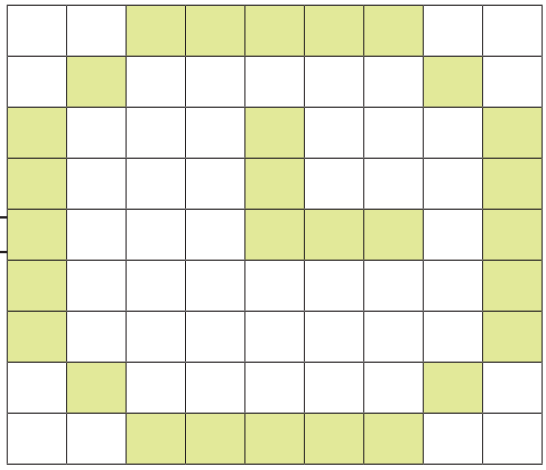
3.3 Binary Code

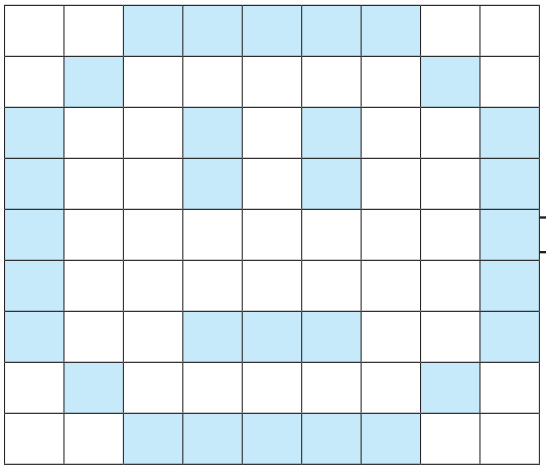
A. *Look at the images provided below and create a binary code for each by using the numbers 0 and 1.*



0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0
0	0	0	1	1	1	0	0	0
0	0	1	1	1	1	1	0	0
0	1	1	1	1	1	1	1	0
1	1	1	1	1	1	1	1	1
0	0	0	0	1	0	0	0	0
0	0	0	0	1	0	0	0	0
0	0	0	0	1	0	0	0	0

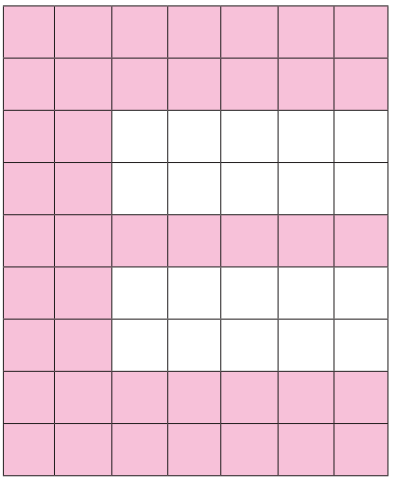
0	0	1	1	1	1	1	0	0
0	1	0	0	0	0	0	1	0
1	0	0	0	1	0	0	0	1
1	0	0	0	1	0	0	0	1
1	0	0	0	1	1	1	0	1
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
0	1	0	0	0	0	0	1	0
0	0	1	1	1	1	1	0	0



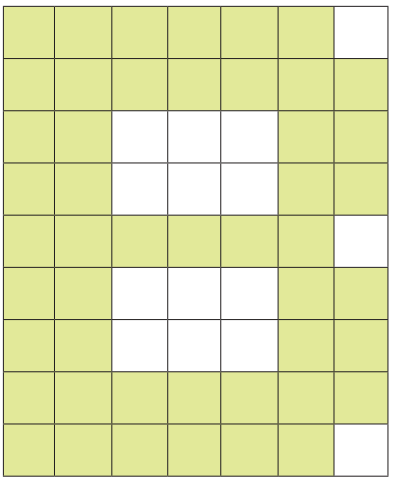


0	0	1	1	1	1	1	0	0
0	1	0	0	0	0	0	1	0
1	0	0	1	0	1	0	0	1
1	0	0	1	0	1	0	0	1
1	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
1	0	0	1	1	1	0	0	1
0	1	0	0	0	0	0	1	0
0	0	1	1	1	1	1	0	0

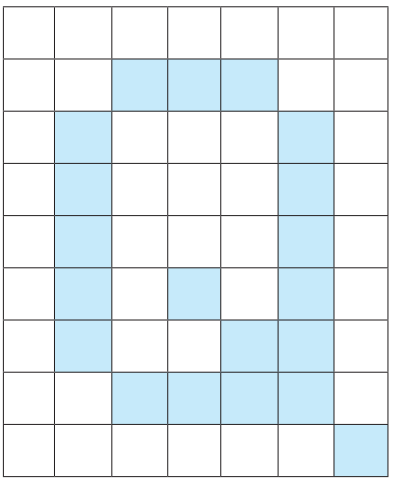
B. *Write the binary codes for the below images using the numbers 0 and 1.*



1	1	1	1	1	1	1
1	1	1	1	1	1	1
1	1	0	0	0	0	0
1	1	0	0	0	0	0
1	1	1	1	1	1	1
1	1	0	0	0	0	0
1	1	0	0	0	0	0
1	1	1	1	1	1	1
1	1	1	1	1	1	1



1	1	1	1	1	1	0
1	1	1	1	1	1	1
1	1	0	0	0	1	1
1	1	0	0	0	1	1
1	1	1	1	1	1	0
1	1	0	0	0	1	1
1	1	0	0	0	1	1
1	1	1	1	1	1	1
1	1	1	1	1	1	0



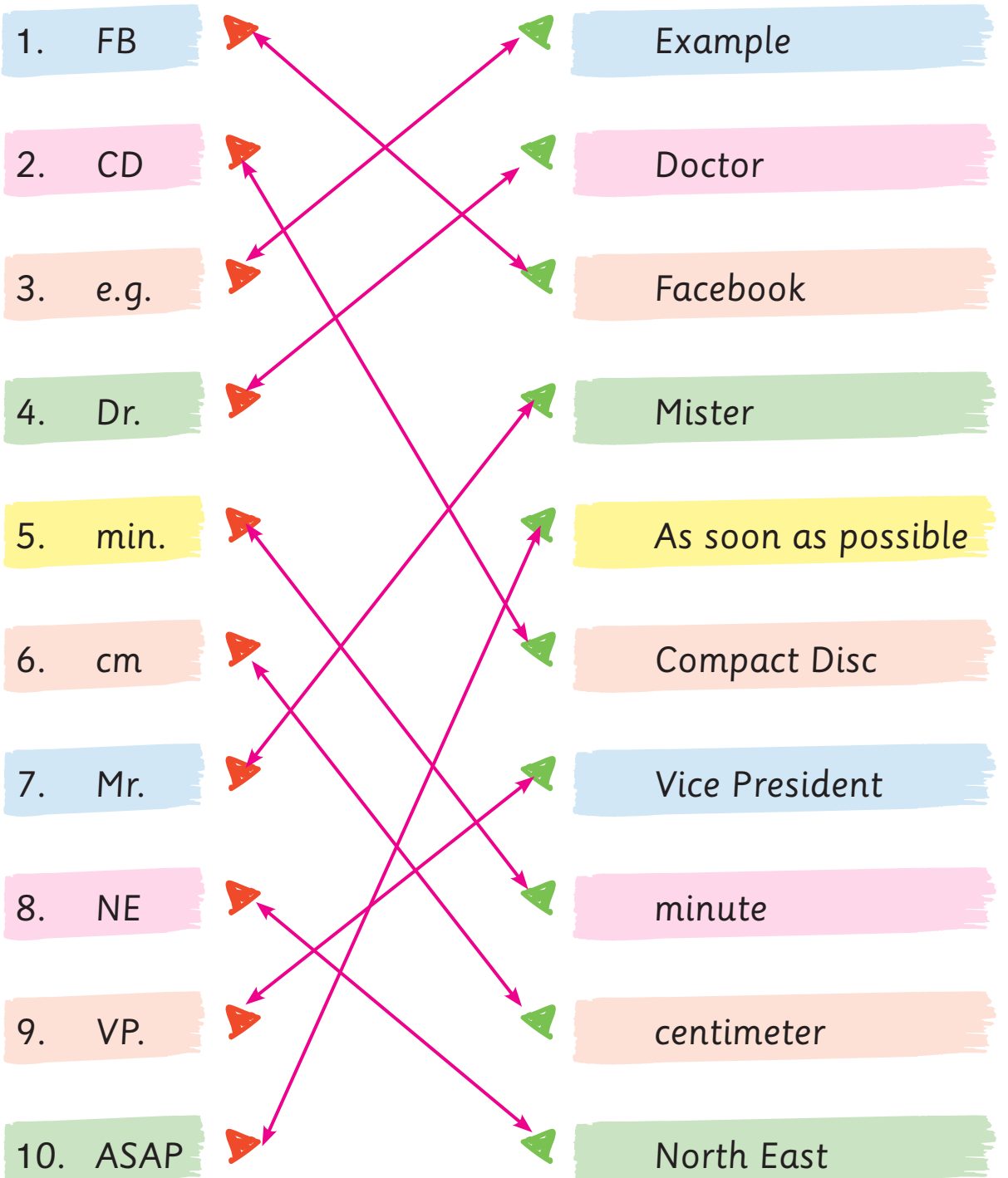
0	0	0	0	0	0	0
0	0	1	1	1	0	0
0	1	0	0	0	1	0
0	1	0	0	0	1	0
0	1	0	0	0	1	0
0	1	0	1	0	1	0
0	1	0	0	1	1	0
0	0	1	1	1	1	0
0	0	0	0	0	0	1

C. *Colour the boxes having number 1 with yellow.*

0	0	0	0	0	0	1	0	0	0	0	0	0
0	0	0	0	0	1	1	1	0	0	0	0	0
0	0	0	0	1	1	1	1	1	0	0	0	0
0	0	0	1	1	1	1	1	1	1	0	0	0
1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	0	0	1	0	0	0	1	0	0	1	1
1	1	0	0	1	0	0	0	1	0	0	1	1
1	1	1	1	1	0	0	0	1	1	1	1	1
1	1	1	1	1	0	0	0	1	1	1	1	1

3.4 Data Compression

A. Match the following abbreviations with their acronyms.



B. *It is the story of a dog and the bone. Decode the compressed message and rewrite the story in the space provided below.*

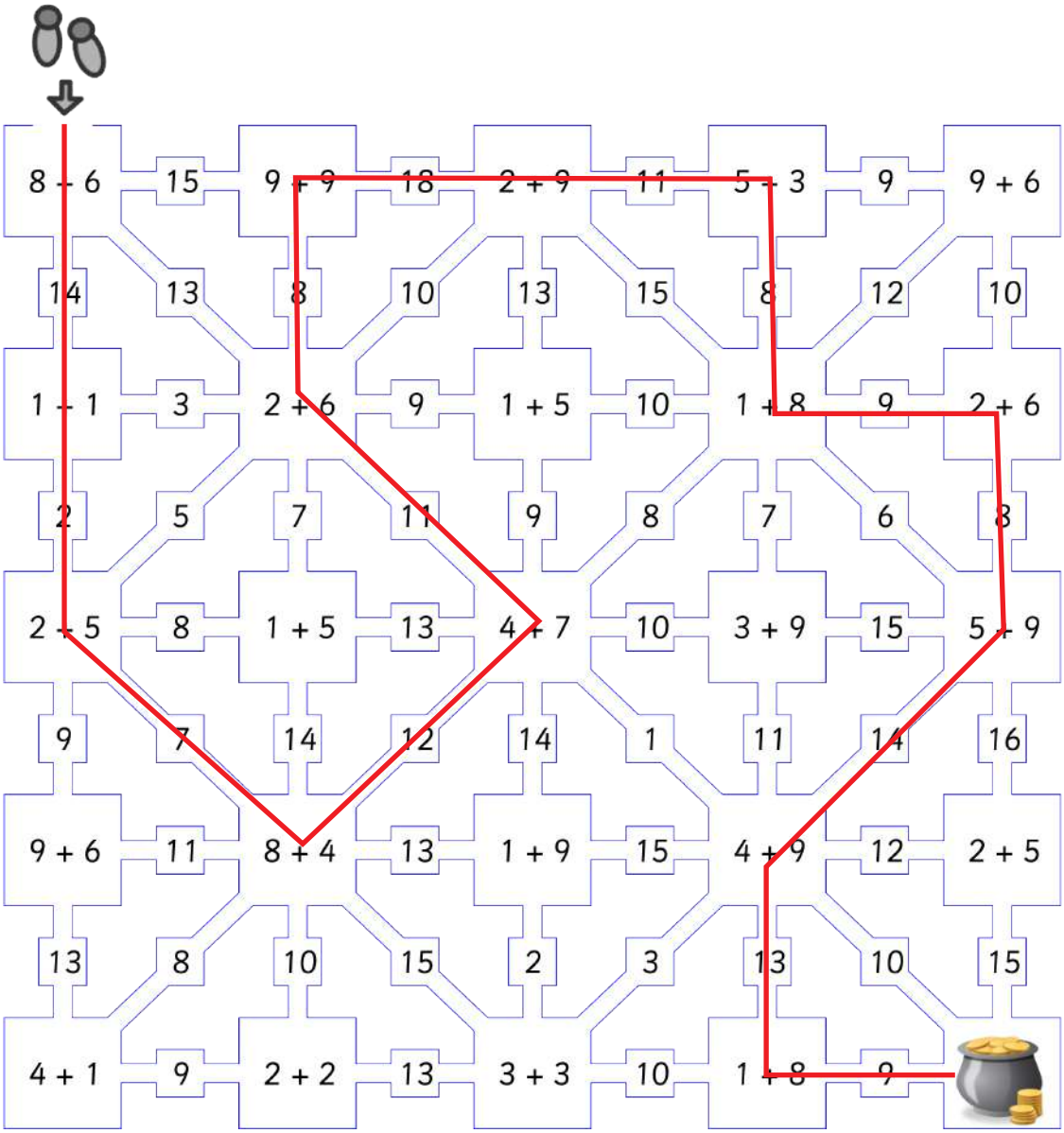
Once there was a  who wandered the streets  and  in search of food. One  , he found a big juicy  and he immediately grabbed it between his  and took it  . On his way  , he crossed a  and saw another  who also had a  in its  . He wanted that  for himself too. But as he opened his  , the  he was biting fell into the  and sank. That  , he went  hungry.

ANS. Once there was a dog who wandered the streets day and night in search of food. One day, he found a big juicy bone and he immediately grabbed it between his mouth and took it home. On his way home, he crossed a river and saw another dog who also had a bone in its mouth. He wanted that bone for himself too. But as he opened his mouth, the bone he was biting fell into the river and sank. That night, he went home hungry.

Coding Challenge-3

Addition Maze

You have to find the path in this addition maze. Start at the entrance and solve the addition problem, then go to the path with the correct answer, and so on. If you do this correctly you will find a pot full of gold!



4.1 Algorithm

A. Fill in the missing blanks to complete the given algorithm to go to the stationary and buy a pen.

Step 1 Start

Step 2 Go to a stationary shop.

Step 3 Select a ___pen___.

Step 4 Ask the ___shopkeeper___ for its price.

Step 5 Pay the ___money___ .

Step 6 Take the ___pen___ .

Step 7 Come back.

Step 8 End

B. *Read and complete the algorithm to find the sum and product of two numbers.*

Step 1: Start

Step 2: Read the first number (let's call it A)

Step 3: Read the second number (let's call it B)

Step 4: Add A and B together

Step 5: Store the result of sum (let's call it C)

Step 6: Display the value of C

Step 7: Multiply A and B together

Step 9: Store the result of product (let's call it D)

Step 9: Display the value of D

Step 10: End

Let's say the two numbers are 5 and 3. Now complete the algorithm given below.

Step 1: Start

Step 2: Read A = 5

Step 3: Read B = 3

Step 4: Add A + B = 5 + 3 = 8

Step 5: Sum = C = 8

Step 6: Display C (output: 8)

Step 7: Multiply A x B = 5 × 3 = 15

Step 8: Product = D = 15

Step 9: Display D (output: 15)

Step 10: End

C. *Complete the following algorithm to prepare a tea. Take hints from words given in the help box.*

hot	sugar	cup
add	milk	turn off
gas	pan	boils

Step 1: Start

Step 2: Take a pan, water, ___sugar___, tea leaves and ___milk___.

Step 3: Put the ___pan___ on the gas burner and pour water in it.

Step 4: Turn on the ___gas___.

Step 5: Put some tea leaves when the water ___boils___.

Step 6: Put some sugar and ___add___ milk also.

Step 7: After processing, take off the pan and ___turn off___ the gas.

Step 8: Sieve into a ___cup___ and serve the ___hot___ tea.

4.2 Programs: Conditions

A. Complete the conditional program to check whether the child fails or pass if the passing marks are 30.

If

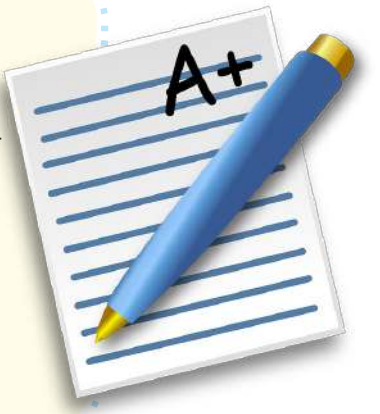
Marks obtained are > 30

Then

Display Pass

Else

Display Fail



B. 'If' an event occurs, 'then' what happens? Complete the given statements.

1. If we eat vegetables, then we stay healthy.
2. If it is hot outside, then we feel hot.
3. If the traffic light is yellow, then slow down.
4. If it is extremely hot, then wear light clothes.
5. If it is hot, then drink water.
6. If it is raining, then use an umbrella.
7. If phone's battery is low, then charge the phone.
8. If you are sick, then see a doctor.

9. If you listen carefully, then you will understand better.

10. If you share your toys, then others will be happy.

C. Take a look at the given program and use colours to fill in the boxes.

If (*number is divisible by 2*) then colour Red

If (*number is divisible by 3*) then colour Blue

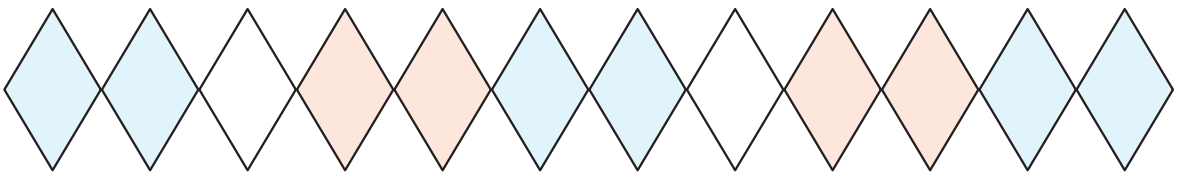
			9	21			
			15	27			
			3	33			
		4	22	14	8		
50	20	14	26	64	10	82	48
32			2	22			34
			38	28			
		63	51	45	3		
	99	93	81	75	87	69	

4.3 Programs: Loops

A. Read the given programs and do as instructed.

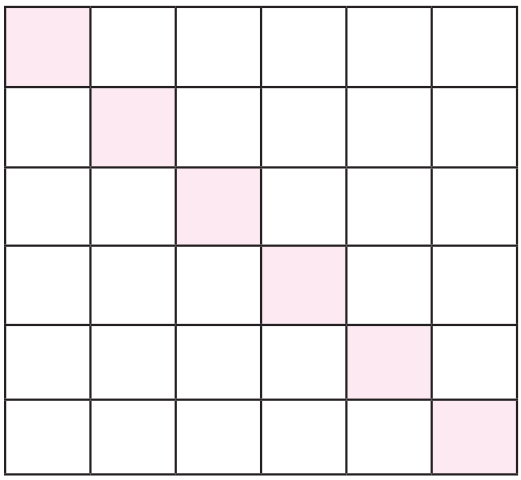
1. Program

Repeat 2 times
(
Colour two diamonds
blue
Skip one diamond
Colour two diamonds red
)



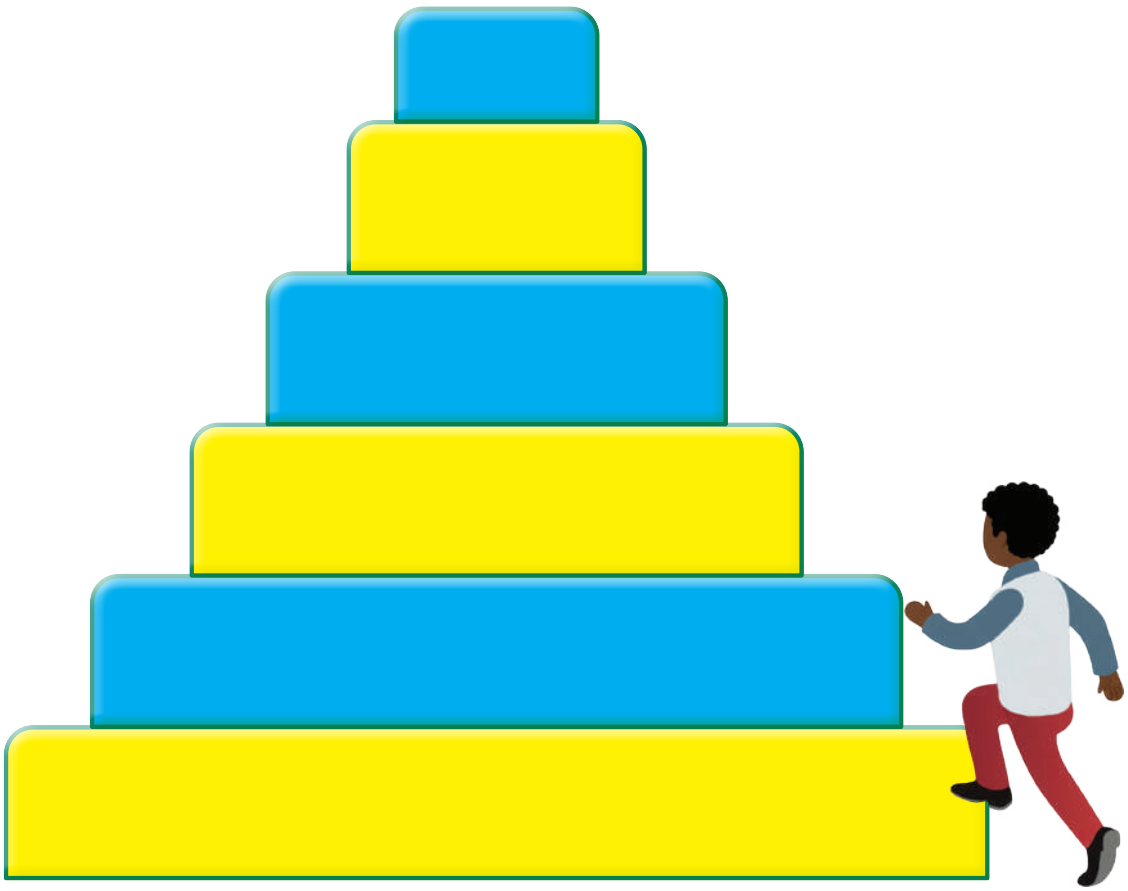
2. Program

Repeat 6 times
(
Colour pink
Move one right
Move one down
)



B. *Read the given program and colour the stairs as directed.*

```
Repeat 3 times
(
Colour Yellow
Move Up
Colour Blue
Move Up
)
```



Coding Challenge-4

Banana Muffin

Help Daniel prepare banana muffins by putting the given steps in the correct sequence from 1 to 6.

5

Mix well.

Pour batter into a greased leaf pan or muffin pan.

4

Mix in dry ingredients.

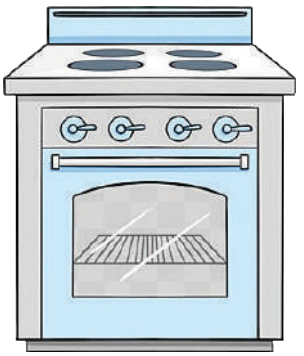
2 ½ cups flour

1 teaspoon baking soda

1 teaspoon salt

6

Bake at 350° for 30-35 minutes.



2

Add eggs and milk.

2 eggs

½ cup buttermilk

1

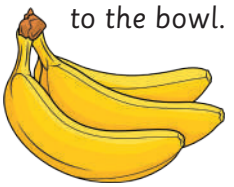
Mix sugar and butter.

1 ½ cup sugar

1 ½ cup butter

3

Mash 3 ripe bananas. Add to the bowl.



Add 1 teaspoon vanilla.

ESSENTIAL CODING

Basic 5

Facilitator's Guide

In today's fast-changing digital world, coding is more than just using computers — it is about **thinking**, **reasoning**, and **problem-solving**.

The ESSENTIAL **Coding Basic 5 Facilitator's Guide** is designed to support teachers in delivering coding concepts effectively, even before learners begin programming on computers.

The ESSENTIAL **Coding Basic 5 Facilitator's Guide** provides:

- Clear, step-by-step teaching support for every lesson
- Structured lesson delivery with guided teacher–learner interaction
- **Coding Link** sections that explain how each activity connects to real coding
- Strong focus on computational thinking and problem-solving
- Classroom-ready strategies for engaging young learners
- Progress tracking and assessment support

This guide helps teachers understand that:

- Coding starts with thinking, not typing
- Every activity builds coding skills
- Learners are already "coding" when they count, follow steps, recognise patterns, and make decisions

Through this approach, teachers confidently guide learners to **think like programmers from an early stage**.

With clear instructions, reinforcement strategies, and practical examples, this guide transforms lessons into:

- Interactive learning experiences
- Logical thinking development
- Structured problem-solving sessions

Teachers are not just teaching activities —
They are building **future coders and critical thinkers**.

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