



11+ Non-Verbal Reasoning Lesson Plan

Topic: Adding and Subtracting Pattern Contents (Figure Arithmetic)

Target Age: 10-11 years (Preparing for 11+ Exams)

Time: 60 Minutes

Resources: Whiteboard/Projector, Handouts with Exercise Questions.

Website: <https://oatutors.co.uk/>

This lesson plan is designed for a 1-hour session focusing on the “Adding and Subtracting Pattern Contents” question type in Non-Verbal Reasoning (NVR). This involves treating figures as mathematical equations to find the missing result.

1 Introduction & Warm-up (10 Minutes)

Time	Activity	Description
5 mins	Introduce the Concept	Explain the rule: In these questions, figures are treated like equations. The third figure is the result of adding or subtracting the first two figures. Figure 1 + Figure 2 = Figure 3 or Figure 1 – Figure 2 = Figure 3.
5 mins	Simple Visual Warm-up	Draw a quick example: A box with a Black Circle + A box with a White Square = A box with a Black Circle and White Square. Stress that “adding” means combining everything and “subtracting” means removing items that appear in the second box.

2 Core Concepts & Strategy (15 Minutes)

Time	Activity	Description
10 mins	The 'Overlap Rule' and 'Change' Rule	Introduce the two main rules for combining shapes: 1. The 'Adding' Rule ($X + Y = Z$): Every single shape and element from X and Y must appear in Z , unless there is a specific rule (like shapes cancelling out). 2. The 'Cancelling/Subtracting' Rule ($X - Y = Z$ or $X \leftrightarrow Y = Z$): If a shape or element appears in both Figure 1 and Figure 2, it disappears (cancels out) in Figure 3. If a shape appears in only one of the first two, it remains in Figure 3.
5 mins	Worked Example (Teacher-Led)	Display an example of the Cancelling Rule: Figure 1: Black Circle, White Square. Figure 2: White Square, Black Triangle. Figure 3: Black Circle, Black Triangle. (The White Square was in both, so it cancels out.) Verbalise the logic step-by-step.

3 Guided Practice & Exercise Questions (20 Minutes)

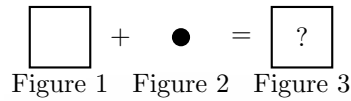
Distribute the handout. For the Cancellation/Subtraction questions, encourage students to mentally or physically cross out the shapes that appear in both of the first two figures.



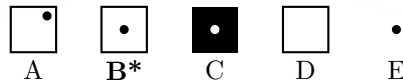
Exercise Questions (Handout)

Instructions: The figures follow the rule Figure 1 + Figure 2 = Figure 3 or a cancellation/subtraction rule. Find the figure that completes the third box.

Question 1: Simple Addition

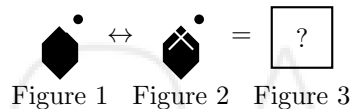


Options:



- **Rule:** Figure 3 is the direct combination of Figure 1 and Figure 2.
- **Answer:** B

Question 2: Cancellation Rule

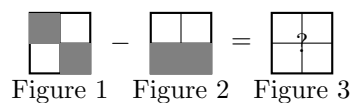


Options:

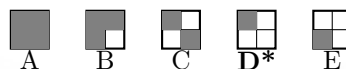


- **Rule:** Elements that appear in both Figure 1 and Figure 2 cancel out (Black Hexagon, Black Dot). Elements that appear in only one remain (White Star, White Cross).
- **Answer:** C

Question 3: Multiple Feature Subtraction



Options:



- **Rule:** Shading cancels out if present in the same position in both Figure 1 and Figure 2. (Bottom-right cancels). Shading remains if only in one figure (Top-left remains, Bottom-left remains). Assuming the core rule is finding the unique elements: The unique elements are Top-left (from F1) and Bottom-left (from F2). Given the options, let's assume the question means "find the position that was shaded in F1, but NOT in F2."
- **Simpler Rule (if D is correct):** Figure 3 is the result of taking ONLY the elements that were unique to Figure 1. (Top-left was in F1 but not F2).
- **Answer:** D (Assuming the simpler rule above for a typical 11+ single answer format)



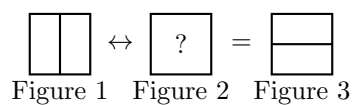
4 Review and Wrap-up (15 Minutes)

Time	Activity	Description
5 mins	Quick Check	Review the difference between simple addition (Q1) and cancellation (Q2). Stress that the cancellation rule is the most common for these problems.
10 mins	Assignment	Introduce the homework assignment. Students must identify the rule (addition or cancellation) and apply it precisely.

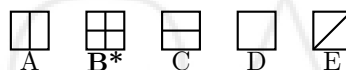
Assignment (Homework)

Instructions: For each question, decide whether the pattern is following an Addition Rule (combining) or a Cancellation Rule (crossing out shared items). Then, find the missing figure.

Assignment Question 1: Finding the Missing Middle Figure

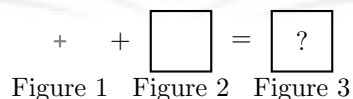


Options for Figure 2:

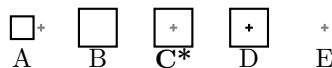


- **Rule:** Cancellation (elements in both cancel). To get just the horizontal line remaining in F3, the vertical line must have been cancelled by F2, and the horizontal line must have been unique to F2. → F2 must contain both lines.
- **Answer:** B ($F1 + F2 = F3 \rightarrow \text{Vertical} + (\text{Vertical and Horizontal}) = \text{Horizontal only remains}$)

Assignment Question 2: Simple Addition



Options:



- **Rule:** Simple Addition (Combining F1 and F2). F3 must contain both the large black square and the small grey cross in the centre.
- **Answer:** C