Science Lab: Investigating Mixtures and Solutions

Learning objective: To understand how to separate mixtures through filtering, sieving, and evaporation, and to identify which substances dissolve to form solutions.

Read each question carefully and use your knowledge of materials and their properties to answer. Show your working out for any calculations.

Nova the owl is helping Bea the bee tidy the laboratory. They have several mixtures that need separating. Help them identify the best methods to return the materials to their original states.

Word bank: solute · solvent · solution · soluble · insoluble · evaporation · filtering · sieving

1. Bea has a mixture of sand and water. Explain which separation method is most suitable to separate the sand from the water and why the sand does not dissolve. (2 marks)

2. Nova adds 50g of salt to 200ml of water. The salt disappears into the water. Use the correct scientific terms to describe the salt, the water, and the final mixture created. (3 marks)

3. If Nova wants to recover the solid salt from the saltwater solution, which separation process should she use? Describe how this process works. (2 marks)

4. Max the monkey has a mixture of marbles and flour. Which piece of equipment would be best to separate these? Explain your choice. (2 marks)

5. A store sells a 'Discovery Kit' for £12.50. It contains a mixture of iron filings and plastic beads. If you use a magnet to remove the iron filings, is this a physical or chemical change? Explain your reasoning. (2 marks)

Draw: Draw a labelled diagram showing how you would set up a piece of filter paper in a funnel to separate a mixture of soil and water into a beaker.

Extension challenge: Imagine you have a mixture of sand, salt, and iron filings. Create a step-by-step plan using the equipment available in a science lab to separate all three components successfully.