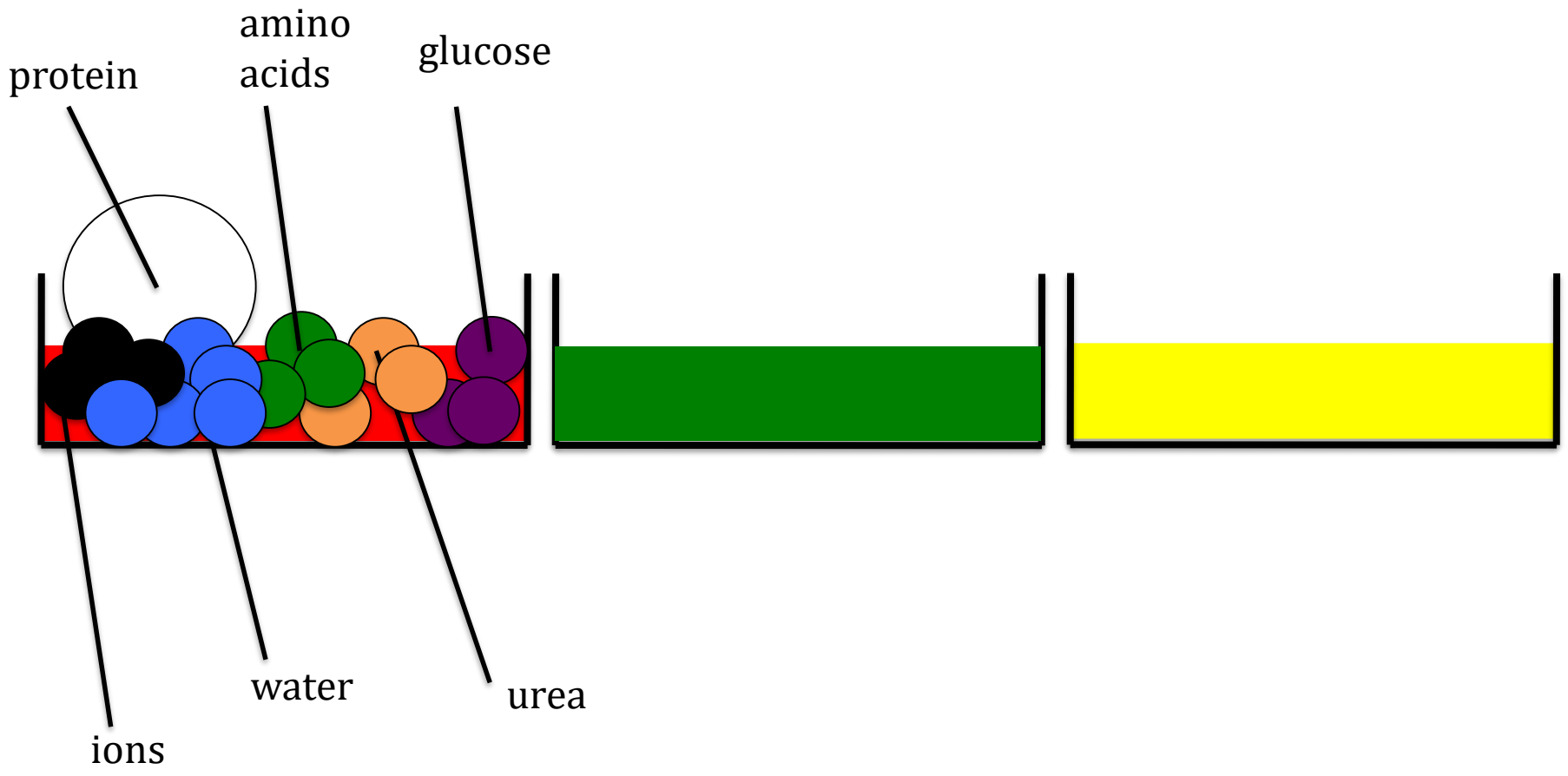


Topic	Function of the kidney - filtration and selective reabsorption	Level	GCSE (or any course for students aged 14-16)
Outcomes	<ol style="list-style-type: none"> 1. To describe what happens to the components of blood at the kidney (urea, glucose, large proteins, ions, amino acids) by considering filtration, selective reabsorption and urine formation 2. Explain the role of ADH on the kidney tubules by regulating the amount of water that is reabsorbed 		
Information for teachers	<p>This activity uses a model to help students understand the function of the kidney. Use this activity after students have been introduced to the concepts of ultrafiltration and selective reabsorption. The model provides an opportunity to really explore and advance understanding.</p> <p>To set up the model fill three glass troughs or washing up bowls with water, food dye and balls according to the diagram on slide 2. This activity is best carried out as a demonstration by gathering students around the three buckets.</p>		

Blood arriving at kidney

Kidney filtrate

Urine



The demonstration

We have three buckets that represent blood, kidney filtrate and urine. In the blood we have five different particles represented by balls: urea, glucose, large proteins, ions and amino acids (show slide 2). Ask students to give examples of large proteins in blood.

Make it clear that you are going to model what happens to each particle as blood arrives at the kidneys by moving particles from one trough to another. Demonstrate what happens to glucose by moving **all** of the purple balls from the red trough into the green trough to show filtration. Pose the question as to whether this molecule is useful or not? You then illicit ideas of useful molecules being reabsorbed into the blood and unwanted molecules forming urine. Now ask different students to use the model for: amino acids (red → green → red), urea (red → green → yellow), water (red → green → some into red and excess into yellow) ions (same as water) and protein (stays in red). Question and provide feedback throughout.

To consolidate, ask one student to volunteer to do all of the particles with the help of the class. Finally, to explore the role of ADH, sprinkle some glitter into the red trough and ask the class what would happen to the movement of water particles now. In this model more water would now be returned to the red trough and less water would enter the yellow trough. Now ask students to complete the table and Qs on slide 4.

	Present in ... Y or N			Explanation
	Blood	Filtrate	Urine	
Glucose	Y	Y	N	<i>All glucose is reabsorbed back into the blood as it is a useful molecule for cells. It is used in respiration.</i>
Urea				
Amino acids				
Water				
Ions e.g. Na ⁺ and Cl ⁻				
Protein				

1. Complete the table
2. Protein was represented by a football in this model. Name some proteins that are transported in the blood?
3. Describe how the table above would be different for a person suffering from:
 1. diabetes.
 2. high blood pressure.