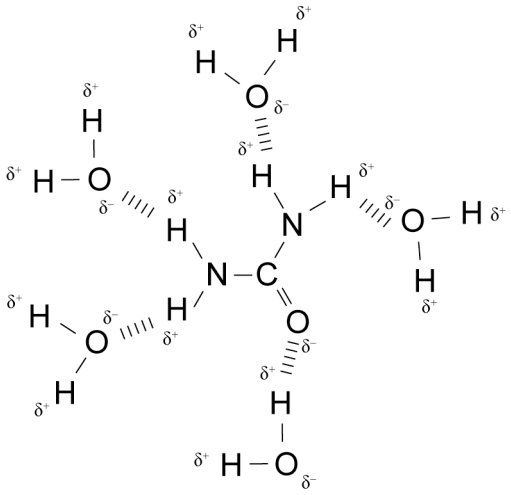
Assessment Schedule

Science: Describe the chemical properties and effects of fertilisers (90766)

Evidence Statement

Question	Achievement	Achievement with Merit	Achievement with Excellence
1(a)	Reacts to give a salt and carbon dioxide gas. OR To make soil more basic / less acidic.		
(b)	$(NH_4)_2SO_4$ is an acidic fertiliser / adding acid keeps fertliser below 7.	$(NH_4)_2SO_4$ is an acidic fertiliser OR Adding acid keeps fertliser below 7. OR Shows $(NH_4)_2SO_4$ breaks up into NH_4^+ and SO_4 (ions) OR In water ammonium sulfate, $(NH_4)_2SO_4$ breaks up into NH_4^+ and SO_4^{2-}. OR NH_4^+ is acidic. OR more H^+ ions in soil keeps pH <7 2 points linked.	NH_4^+ reacts with water to give H_30^+ ions. $NH_4^+ + H_2O \Leftrightarrow NH_3 + H_3O^+$ (equation not necessary). OR $(NH_4)_2SO_4$ is an acidic fertiliser adding acid keeps fertliser below 7. OR Shows $(NH_4)_2SO_4$ breaks up into NH_4^+ and SO_4 (ions) OR In water ammonium sulfate, $(NH_4)_2SO_4$ breaks up into NH_4^+ and SO_4^{2-}. OR NH_4^+ is acidic. OR More H^+ ions in soil keeps pH <7 3 points linked.
2(a)	Mass urea 60 Percentage N in urea is $\frac{28}{60} \times \frac{100}{1} = 46.7\%$ OR Incorrect calculation of Urea N percentage to show Urea higher in N.	Urea has 46.7% nitrogen and ammonium sulfate has 21.2%; therefore urea has highest nitrogen percentage.	
(b)	Urea best nitrogen source as most percentage of nitrogen. Allow follow-on error from 2(a) for Achievement.	Urea more soluble than ammonium sulfate (both fertilisers are soluble). OR Nitrogen needed by plants to either build amino acids/proteins/DNA or develop leaves and stems of plants so they are not stunted or yellow.	Urea more soluble than ammonium sulfate (both fertilisers are soluble). AND Nitrogen needed by plants to either build amino acids/proteins/DNA or develop leaves and stems of plants so they are not stunted or yellow.

(c)	Urea is polar and dissolves in polar water.	Urea molecules seperated from each other by water and so dissolves OR Positive parts of Urea attacted to negative parts of Water and negative parts of Urea attracted to postive parts of water.	Urea molecules seperated from each other by water and so dissolves OR Positive parts of Urea attacted to negative parts of Water and negative parts of Urea attracted to postive parts of water. OR Diagram shows or states that positive hydrogen end of water molecule attracts to negative oxygen part of urea molecule, and oxygen end of water molecule is attracted to positive part of urea molecule and so urea molecule seperates, therefore urea dissolves. 2 Points Linked. 
3(a)	Nitrogen fixation is where the plant can use nitrogen from the air as a nutrient. OR Clover provides soil with Nitrogen.	Nitrogen fixation occurs as a result of a type of bacteria that lives on nodules on the clover plant roots.	Bacteria (Rhizobium Bacteria) on the root nodules of the clover take N_2 from air in the soil and convert it to Ammonia, which is converted to Ammonium ion to be used by plant. OR Clover seeds included in seed mix so that the ammonium ion (nitrogen) now in the soil can be used by other plants to improve their growth.
(b)	Excessive plant growth is caused by excess fertilizers (nitrogen and phosphorus) OR Water quality lowered OR Less Oxygen gas in water.	Fertilisers ferilises plants (algae) in water causing them to grow AND / OR Nitrogen and / or Phosphorus are excess Nutrients. AND / OR Water quality lowered as less Oxygen gas in water. AND / OR Lower water quality leads to Aquatic life, eg fish dying. 2 points linked.	Fertilisers ferilises plants (algae) in water causing them to grow AND / OR Nitrogen and / or Phosphorus are excess Nutrients. AND / OR Water quality lowered as less Oxygen gas in water. AND / OR Lower water quality leads to Aquatic life eg, fish dying. 3 points linked.

Judgement Statement

Achievement	Achievement with Merit	Achievement with Excellence
Total of FOUR opportunities answered at Achievement level (or higher). $4 \times A$	Total of FOUR opportunities answered with THREE at Merit level (or higher) and ONE at Achievement level. $3 \times M + 1 \times A$	Total of FOUR opportunities answered with THREE at Excellence level and ONE at Achievement level. $3 \times E + 1 \times A$