Worksheet 6.6

The nitrogen cycle

NAME: **CLASS:**

INTRODUCTION

Providing sufficient food for the world's increasing population involves the use of fertilisers manufactured from ammonia, nitric acid and sulfuric acid. However, use of these fertilisers affects the nitrogen cycle. This worksheet allows you to research the nitrogen cycle.

No.	Question	Answer
1	Define nitrogen fixation.	
2	Why do living things require nitrogen?	
3	In the soil, what is the function of: **a** nitrifying bacteria? **b** denitrifying bacteria? **c** ammonifying bacteria?	
4	Write a chemical equation(s) to show an example of industrial nitrogen fixation.	
5	How can biological nitrogen fixation occur?	
6	Plants absorb nitrogen in the form of nitrate ions (NO_3^-). They then turn the nitrogen into amino acids like glycine (H_2NCH_2COOH). If a certain plant absorbs 0.500 g of nitrate ions, what mass of glycine could it make?	
7	What mass of nitrogen from the atmosphere would have to be 'fixed' in order to produce 20.6 g of nitrate ions?	
8	Write the equation for the reaction of the weak base ammonia (NH_3) with water.	

© Pearson Australia (a division of Pearson Australia Group Pty Ltd).
This page from the *Chemistry for WA 2, Teacher Resource Centre* may be reproduced for classroom use.

9	Write the equation for the reaction of NO_2 with water, producing both nitric (HNO_3) and nitrous (HNO_2) acids.	
10	Outline one pathway by which nitrogen in the air could end up as part of a protein in a cow.	

The interference of human activities with the natural nitrogen cycle has had profound effects. Humans have interfered with the nitrogen cycle by:

- dumping raw sewage high in nitrogenous wastes. This can lead to eutrophication, which is an excess of nutrients resulting in an algal bloom. The algae take so much oxygen that fish and other marine organisms can no longer survive.
- burning wood and fossil fuels that contain nitrogen, resulting in more nitrogen oxide compounds in the atmosphere
- the large-scale use of fertilisers, which can be leached from the soil and end up in waterways
- overharvesting legumes.

No.	Question	Answer
11	How could excess nitrogen oxides in the atmosphere be a problem?	
12	How does the overharvesting of legumes affect the nitrogen cycle?	
13	Why are fertilisers used on a much larger scale today than ever before?	
14	What is raw sewage and why is it nitrogen-rich?	
15	What are two possible environmental problems resulting from human interference in the nitrogen cycle?	

© Pearson Australia (a division of Pearson Australia Group Pty Ltd).
This page from the *Chemistry for WA 2, Teacher Resource Centre* may be reproduced for classroom use.