Nat 4 : Unit 3 – Industrial chemistry

Key Area – Fertilisers

Lesson 16 – Consolidation

Learning Outcomes

By the end of this lesson, you should be able to…

1. Recall information on fertilisers that you have been studying in the previous week.
2. Complete the online quiz to allow you to monitor your progress.

Success Criteria

You will have been successful in this lesson if you:

1. Revised your notes on fertilisers.
2. Completed The form Fertilisers (Attached at the end of lesson 16) **for Thursday 26th February**
3. If you have any questions about the content of this lesson, you should ask **Mrs Morton** either through **MS team** or via email.

Links to Prior Knowledge

The previous lessons on Fertilisers.

What to do

Instructions Lesson 16

Make sure you are confident about the learning objectives.

Follow the link and complete the multiple-choice quiz on plastics. Use you notes to help. The quiz should take at least 20 minutes to complete if you do it correctly.

LO	I can.....		
1	There are three key elements which provide the nutrients required for plant growth: **nitrogen, phosphorus and potassium.**		
2	Fertilisers can be produced naturally (manure) or in laboratories by chemists using neutralisation reactions.		
3	Give examples of natural and synthetic fertilisers.		
4	Compare the advantages and disadvantages of natural and synthetic fertilisers.		
5	Fertilisers must be soluble in water to be effective. Using the data book to check the solubility will allow me to decide if a fertiliser is suitable for use.		
6	State fertilisers can be made by a neutralisation between an acid and an alkali.		
7	Explain that ammonium hydroxide and potassium hydroxide are good alkalis to use because they contain the key components of fertilisers.		
8	Describe the environmental impact of fertilisers.		
9	Explain that Fertilisers can leech into waterways, rivers and lakes and cause problems with the ecosystem dependant on them.		
10	Explain % composition can be related to the packaging of the fertiliser.		

Summary: Fertilisers

Fertilisers are necessary for good supplies of healthy crops to be grown to meet the demands of our growing population. Just like we need a good diet to grow in a healthy way, plants and crops also require the correct nutrients.

a)Plant nutrients

There are three essential plant nutrients for healthy growth:

- nitrogen (N)
- phosphorous (P)
- potassium (K)

Fertilisers contain one or more of these nutrients and different crops require different proportions of each of the three. For the fertiliser to be effective, it must be soluble so that it can reach the plant's roots.

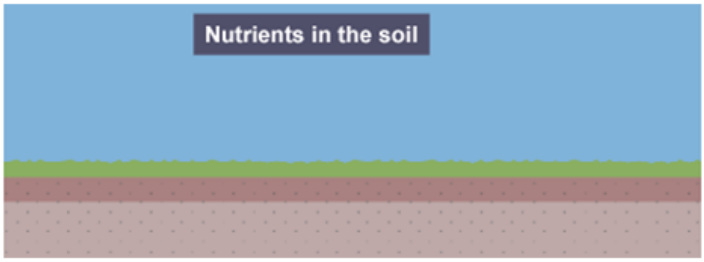
b) Problems with fertilisers

A major problem with the use of fertilisers occurs when they are washed off the land by rainwater into rivers and lakes. The increase of nitrates or phosphates in the water encourages algae growth, which forms a bloom over the water surface. This prevents sunlight reaching other water plants, which then die. Bacteria break down the dead plants and use up the oxygen in the water so the lake may be left completely lifeless.

c) Natural fertilisers

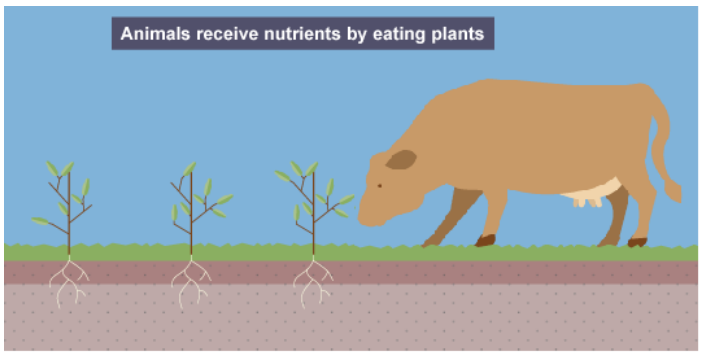
Natural fertilisers are substances that are obtained from plant and animal waste. Nutrients in the soil grow into crops creating plant protein. This plant protein either dies or is eaten by animals. When animals produce waste, the nutrients return to the soil.

Step one

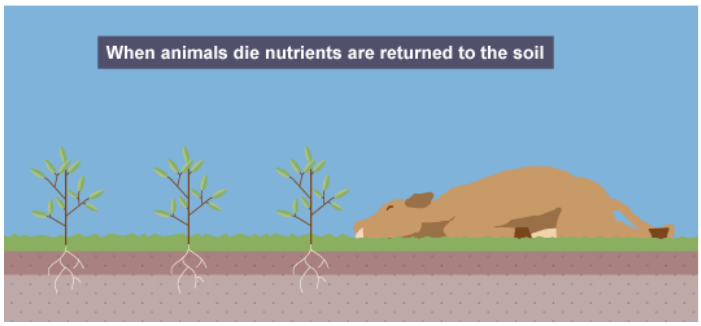


Step two

Step three



Step four



Compost and manure are both the products of plant and animal death and decay. While they both return nutrients to the soil, they are not always the most efficient fertilisers.

Synthetic fertilisers are made by chemists. They can be made by neutralisation reactions and can be designed with a specific crop in mind. The percentage proportions of each of the three essential nutrients are often shown as three numbers on the fertiliser bag.

Some examples of synthetic fertilisers are shown in the table below.

Synthetic fertiliser	Formula
Ammonium nitrate	NH_4NO_3
Ammonium phosphate	$(NH_4)_3PO_4$
Ammonium sulfate	$(NH_4)_2SO_4$
Urea	$(NH_2)_2CO$
Potassium nitrate	KNO_3

Now complete the online Quiz

https://forms.office.com/Pages/ResponsePage.aspx?id=oyzTzM4Wj0KVQTctawUZKV9pDH2i_JVJvH-NwfFQ2VJUMVZNWEJBSkMzM0NZTkZaUUxPNTBKTjk3NS4u