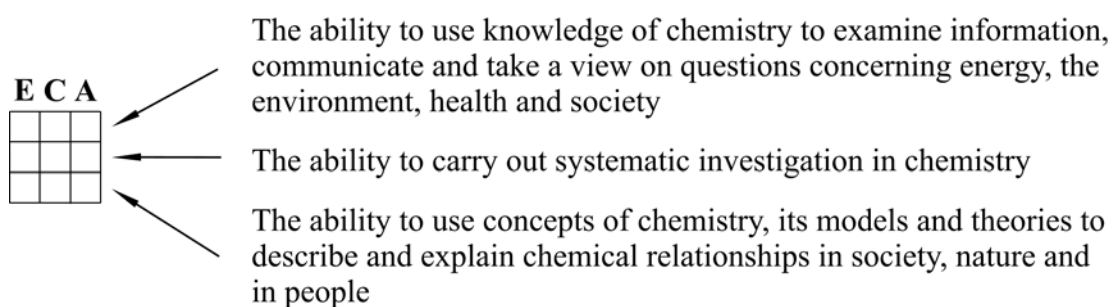


This test will be re-used and is therefore protected by Chapter 17 paragraph 4 of the Official Secrets Act. The intention is for this test to be re-used until 2013-06-30.

NATIONAL TEST IN CHEMISTRY 2013

The national test gives you a chance to show what you know about chemistry. On the right of each question you will find a symbol that tells you which of three abilities you can demonstrate in your answer.

The rows in the symbol describe these different abilities.



For each row you will be able to show your knowledge at three different levels: E, C and A.

For example, the table on the right indicates that the question allows you to show the ability to use concepts of chemistry, its models and theories to describe and explain chemical relationships in society, nature and in people at two different levels, E and C.



Your answers to the questions should be clearly written so that other persons can read your text and understand your meaning. Therefore it is important that you show all your work.

Time allowed: 75 minutes

Name: _____

School: _____ Class: _____

Date of Birth: Year _____ Month _____ Day _____

Girl

Boy

Your answers must be written on separate sheets of paper, NOT on the question paper. The question paper must be returned to your teacher together with your answers.

1. The environment is composed of different chemical compounds. Many of these compounds are built of ions.

a) Which one of the alternatives **A-D** is best describing an ion?

- A. An ion has **as many** electrons as protons.
- B. An ion has **not as many** electrons as protons.
- C. An ion has **as many** neutrons as protons.
- D. An ion has **not as many** neutrons as electrons.



b) Explain why chemical compounds are more common than elements in the environment.



2. In the body, there are molecules called enzymes. An enzyme works as a catalyst and takes part in for instance the digestion of food.

Explain how enzymes influence different chemical reactions in the body.



3. Estelle has rented a car for a weekend. When she is returning the car, she gets a receipt from the car hirer. The receipt shows how much petrol is used and carbon dioxide produced during driving. The receipt shows that the amount of carbon dioxide produced has higher mass than the amount of petrol used.



a) Explain why the amount of carbon dioxide has higher mass than the petrol.



During driving, chemical energy is used.

b) Into which **two** energy forms is the chemical energy transformed during driving?



4. One example of a modern application in chemistry is nanotechnology. Nanotechnology is applied when, for instance, producing sunscreen.

Which one of the alternatives **A-D** is best describing what nanotechnology is?



- A. Nanotechnology is when compounds change phase.
- B. Nanotechnology is to produce new atoms.
- C. Nanotechnology is to change compounds at the atomic level.
- D. Nanotechnology is to create electrons.

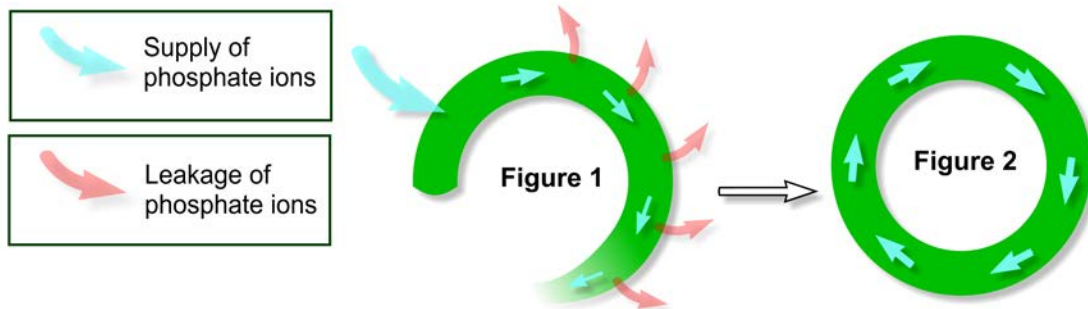
5. When Adam buys medical drugs as tablets, he also receives information about what he shall do with leftovers. The information says that he shall not flush the tablets in the toilet since it is hazardous for the environment.



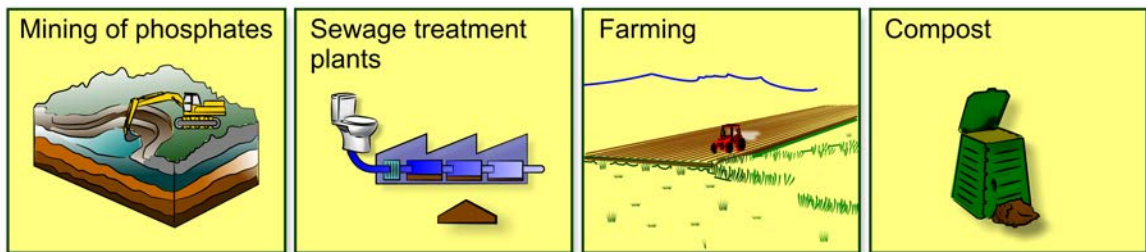
- Explain what happens with the tablets if Adam flushes them in the toilet.
- Explain why Adam must not flush medical drugs in the toilet.



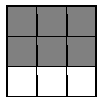
6. Phosphate ions have many important functions in all living organisms. Therefore, all plants and animals must have access to phosphate ions. **Figure 1** and **Figure 2** describe the supply and leakage of phosphate ions in our environment. **Figure 1** describes the situation today and **Figure 2** is a description on what we would like for the future.



Factors influencing the amount of phosphate ions circulating



Use **the four factors** to reason about how we should change our way of living to reach **Figure 2**. That is, to minimize **both** the supply **and** leakage.



7. Anna, Beata and Clas express how they can contribute to a sustainable development. Anna's, Beata's and Clas's suggestions contribute to a different extent to decrease effluents of greenhouse gases and thereby to a sustainable development.



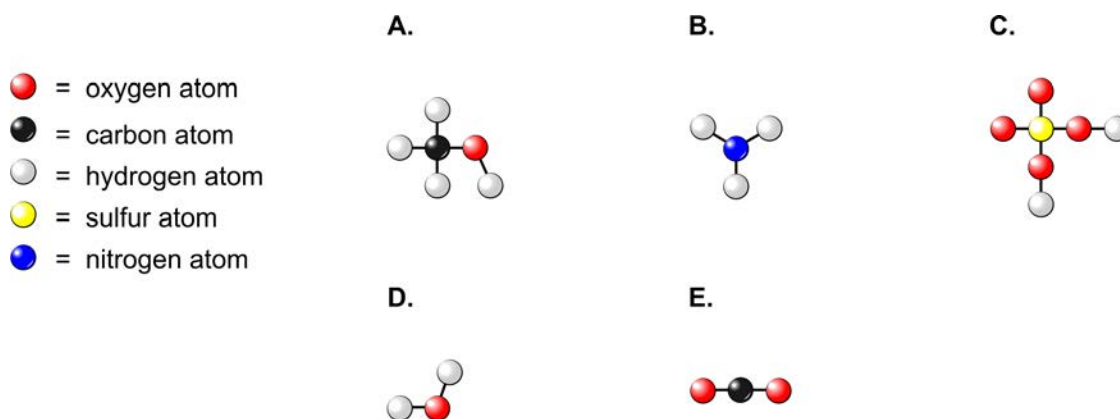
Which utterance do you think contributes **the most, the second most and the least** to a sustainable development?

Use your knowledge on **combustion, carbon dioxide and the greenhouse effect** to reason about how Anna's, Beata's and Clas's suggestions contribute to a sustainable development.



8. Organic compounds are common in the environment and used to be extracted from plants. Today, chemists can produce organic compounds possible for our daily life, for instance in flame retardants, in medical drugs, and as flavour in food.

The picture presents models of different compounds.



- **Which** one of the alternatives **A-E** present a model of an organic compound?
- Explain how our living conditions have been influenced, both in a positive and in a negative way, by the fact that chemists today can produce organic compounds possible to use in our daily life.

