Chemistry

Delprov A1

engelsk version

ÅRSKURS 9

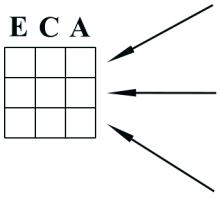
Elevens namn och klass/grupp

Skolverket

NATIONAL TEST IN CHEMISTRY
2019

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.



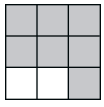
The ability to use knowledge of chemistry to examine information, communicate and take a view on questions concerning energy, the environment, health and society.

The ability to carry out systematic investigation in chemistry.

The ability to use concepts of chemistry, its models and theories to describe and explain chemical relationships in society, nature and in people.

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 that you can use concepts of chemistry, its models and theories to describe and explain chemical relationships in society, nature and in people at level 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

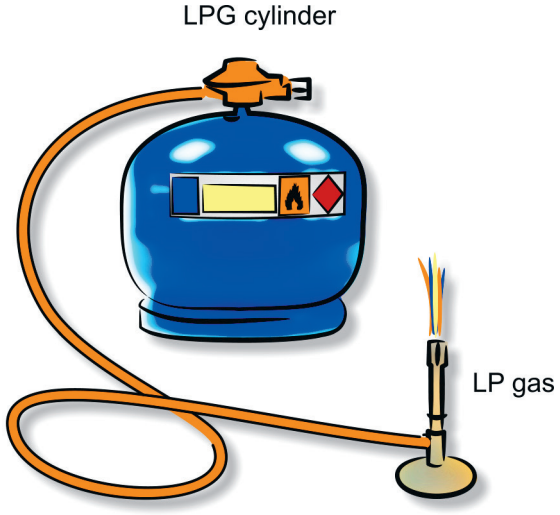
Name: _____

School: _____ Class: _____

Date of Birth: Year _____ Month _____ Day _____

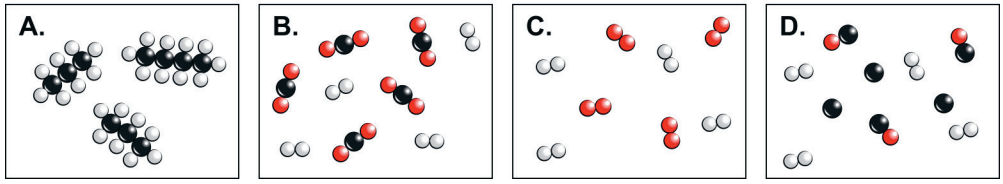
Your answers must be written on separate sheets of paper. The question paper must be returned to your teacher together with your answers.

1. The picture shows an LPG (liquid petroleum gas) cylinder that is sometimes used during chemical experiments. In the cylinder, there are molecules made of carbon atoms and hydrogen atoms.



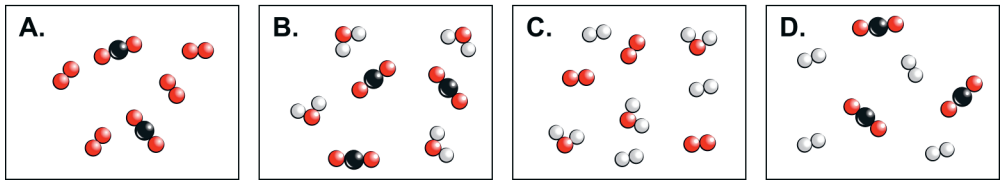
a) One of the pictures A–D describes the molecules in the cylinder. Which one?

Models of molecules



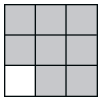
b) One of the pictures A–D describes the molecules that are formed from combustion of LP gas. Which one?

Models of molecules



2. Scientific discoveries have led to the development of many practical applications for society.

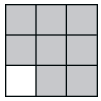
Combine each of the discoveries 1–4 with one of the applications A–D.



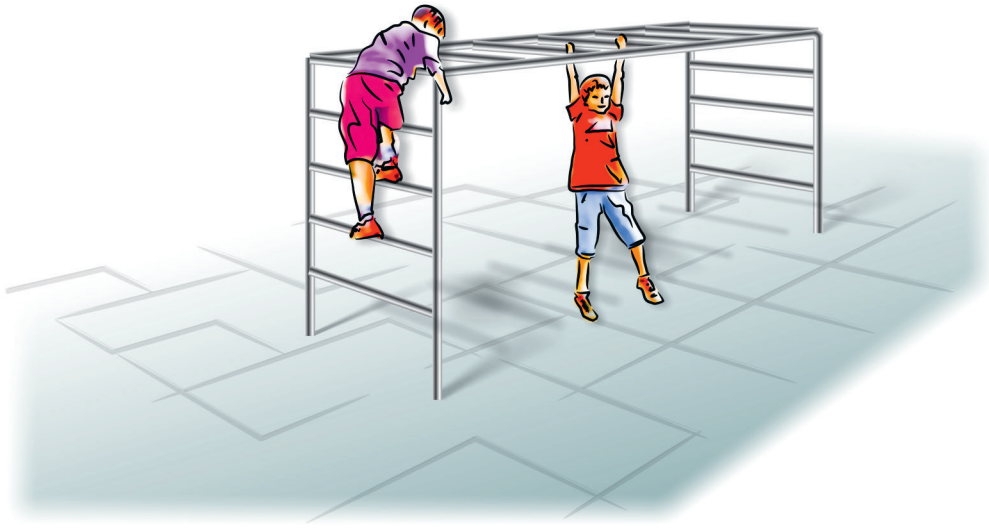
Discovery	Application
1. The structure of the DNA molecule is the same in all living organisms.	**A.** Possibility of conducting electricity in a solution.
2. Salts dissolve into ions in water.	**B.** Possibility of purifying exhaust gases more efficiently.
3. Metals react more or less easily with oxygen.	**C.** Possibility of producing materials that do not corrode.
4. Some compounds speed up chemical reactions without being used themselves.	**D.** Possibility of moving properties from animals into plants.

3. Parts of Sweden have over the last few years had very little snow and rain. In combination with warm summers, this has led to very low water levels in several municipalities. To raise the water level, the water consumption has to decrease.

What can a household do to decrease its water consumption? Give one example.



4. At a schoolyard, there is a climbing frame made of the metal iron. The climbing frame can be treated with different methods to prevent it from rusting.



- Give example of one method that can prevent the climbing frame from rusting.
- Explain how the method can prevent the climbing frame from rusting.

5. In an emergency situation, there may be a shortage of clean drinking water. There are several methods to purify water, but no method can make the water totally clean.

Examples of methods for purifying water:

A. Different compact filters

B. Chlorine solution

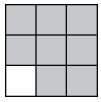
C. Active carbon

D. UV light

- Choose two of the four methods A–D and state how they can purify water.
- State a limitation for each of the methods you have chosen on their possibility to purify water.

6. Potassium ions are good for the muscles and heart function. Potassium ions can be found in, for example, soya beans.

One of the alternatives A–D describes how the potassium ions find their way to the soya beans. Which one?



A. Potassium ions in the ground dissolve and are transported by water into the plant and then further to the soya bean.

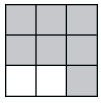
B. Potassium ions in the air find their way to the soya bean when the potassium ions penetrate the surface of the soya bean.

C. Potassium ions are produced from dextrose and sunlight in the plant's leaves and are transported to the soya bean.

D. Potassium ions in raindrops penetrate the plant's leaves and are transported to the soya bean.

7. In a lake, there are phytoplankton. When phytoplankton die, they sink to the bottom and are degraded by bacteria. An increased supply of nutrients into the lake, so called eutrophication, can lead to oxygen deficiency at the bottom.

Explain how an increased supply of nutrients can lead to oxygen deficiency at the bottom.

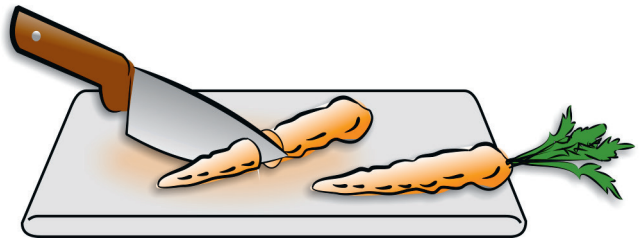


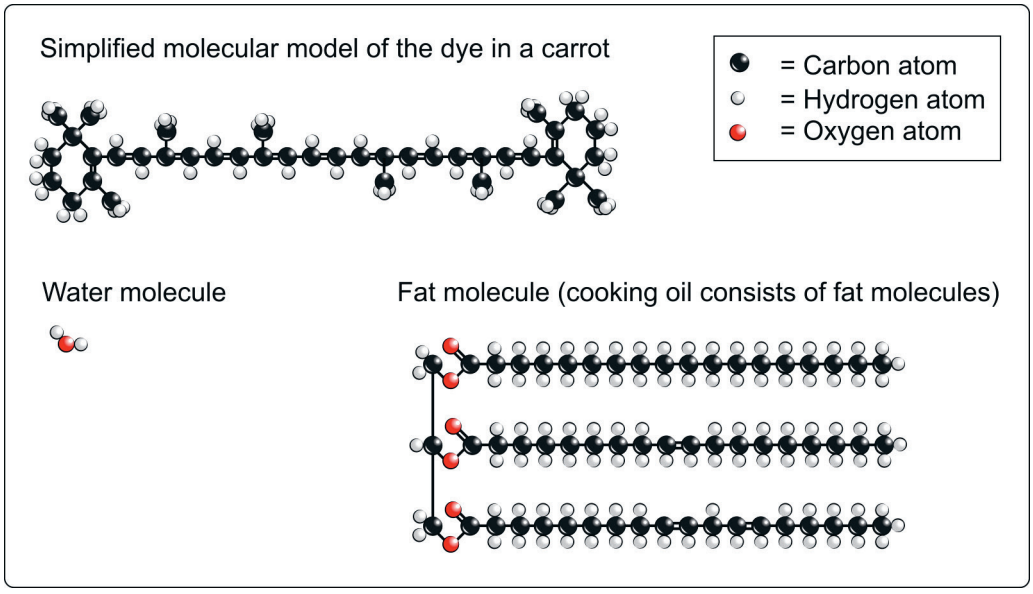
8. In a sink, an alkaline coating has been formed. To remove the plaque, you can use one of the solutions A–C.

Solution A	Solution B	Solution C
pH 4	pH 7	pH 11

- One of the solutions A–C is the best for dissolving the alkaline plaque. Which one?
- Explain why the solution you have chosen can make the plaque disappear.

9. A carrot contains a dye that makes it orange. The dye can, for example, dye a cutting board. To clean the cutting board, it is good to know if the dye is water-soluble or fat-soluble.





- One of the solvents water and cooking oil is better for dissolving the carrot's dye. Which one?
- Use the molecule models and explain why.

10. Fossil fuels in cars are being replaced more and more by other fuels, for example hydrogen gas. When the hydrogen gas is combusted in a car engine, energy and water is produced.

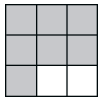
Reason about two effects in two steps that increased use of hydrogen gas as fuel in cars can have on the environment.

11. Several of our medical drugs contain active substances that originally come from plants. In the table, there are some examples.

Active substance	Comes from the plant	Effect in the body
Acetylsalicylic acid	Willow	Decreases pain.
Digoxin	Foxglove	Makes the heart beat stronger.
Paclitaxel	Yew	Prevents different forms of cancer.

Today, active substances in medical drugs can be chemically produced in laboratories.

Explain how the knowledge about how to chemically produce medical drugs can influence the living conditions



- of the individual

  and

- from a larger societal perspective.

UMEÅ UNIVERSITET

Institutionen för tillämpad utbildningsvetenskap