Physics

Delprov A1

engelsk version

ÅRSKURS

9

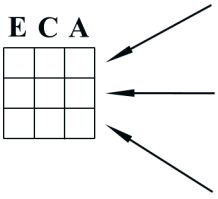
Elevens namn och klass/grupp

Skolverket

NATIONAL TEST IN PHYSICS
2019

The national test gives you a chance to show what you know about physics.
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.



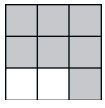
The ability to use knowledge of physics to examine information, communicate and take a view on questions concerning energy, technology, the environment and society.

The ability to carry out systematic investigation in physics.

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

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 physics, its models and theories to describe and explain physics relationships in nature and society 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. Walking with snowshoes in deep snow makes your feet sink less than walking in deep snow without snowshoes.

One of the alternatives A–D is the best explanation of the reason for the feet sinking less with snowshoes. Which one?

A. The body's weight is reduced and the snow's counterforce is larger.

B. The body's weight is reduced and is spread over a larger area.

C. The body's weight is the same and the snow's counterforce is larger.

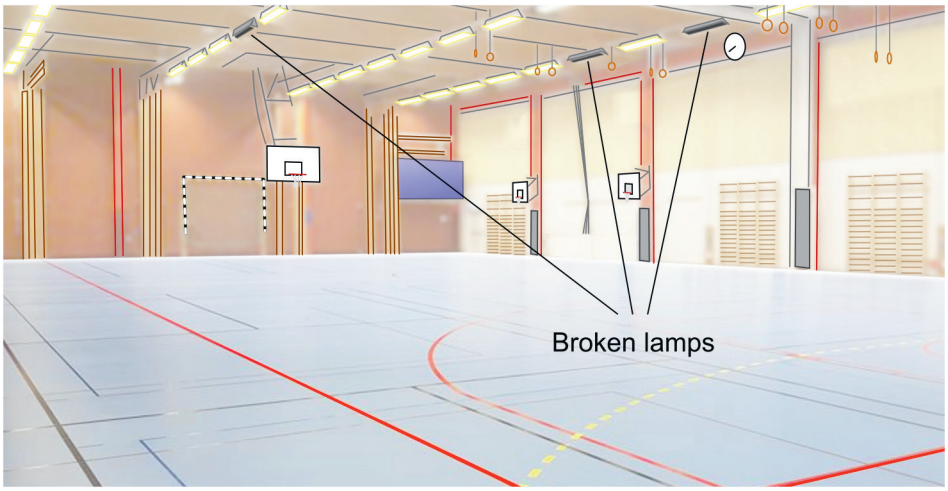
D. The body's weight is the same and is spread over a larger area.

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

Combine each of the discoveries 1–3 with one of the applications A–C.

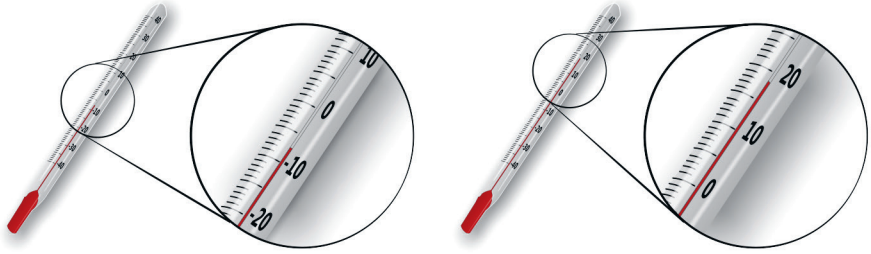
Discovery	Application
1. Substances can emit radiation.	**A.** Possibility of producing batteries.
2. Different metals loose electrons more or less easily.	**B.** Possibility of producing light bulbs.
3. Electrical conductors have electrical resistance.	**C.** Possibility of treating diseases.

3. In a sports venue, all lamps are lit by the same switch. One day when the switch is pushed, three of the lamps are broken but the other lamps are working.



Use your knowledge about electrical networks to explain how the other lamps still can work even though three of the lamps are broken.

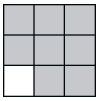
4. A thermometer consists of a glass tube with a red liquid. The level of the liquid in the thermometer rises or falls when the temperature changes.



Use your knowledge about movement of particles to explain why the level of the liquid rises when the temperature increses.

5. The Earth is surrounded by the atmosphere. Located higher up in the atmosphere is the ozone layer. The ozone layer can be thin at some places in the atmosphere.

One of the alternatives A–D best describes what a thin ozone layer might lead to. Which one?



A. An increased amount of carbon dioxide in the atmosphere.

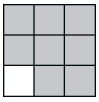
B. An increased amount of nitrogen gas in the atmosphere.

C. An increased amount of ultraviolet radiation towards the Earth.

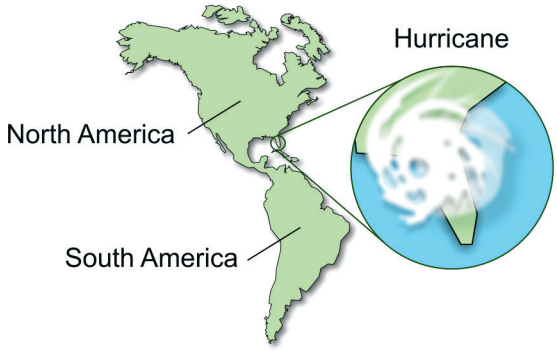
D. An increased amount of visible light towards the Earth.

6. When fuel is burnt in a car engine, a small part of the chemical energy of the fuel is converted into kinetic energy.

Most of the chemical energy is converted into another energy form. Which one?

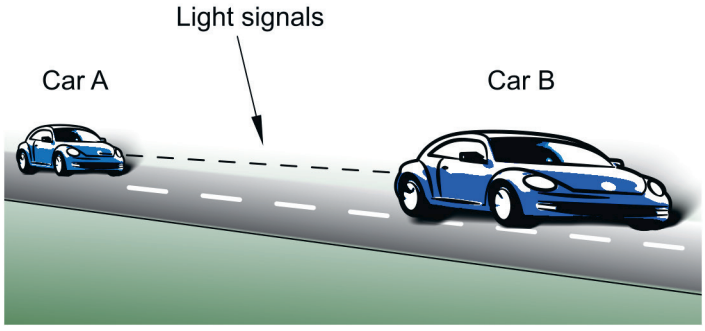


7. Hurricanes are a weather phenomenon developed over warm oceans. In the autumn of 2017, several hurricanes came in over Florida.



Use your knowledge about the relationship between pressure, temperature, and the movement of the air, to explain how hurricanes develop over warm oceans.

8. More and more new cars have a safety function with a laser device emitting light signals to decide the distance to other cars. The picture shows two cars driving after one another. If car A drives too close to car B, car A is automatically slowed down by the safety function.



Explain how light signals can be used to decide the distance between car A and car B.

9. Two of the alternatives A–D best describe the structure and development of the universe.

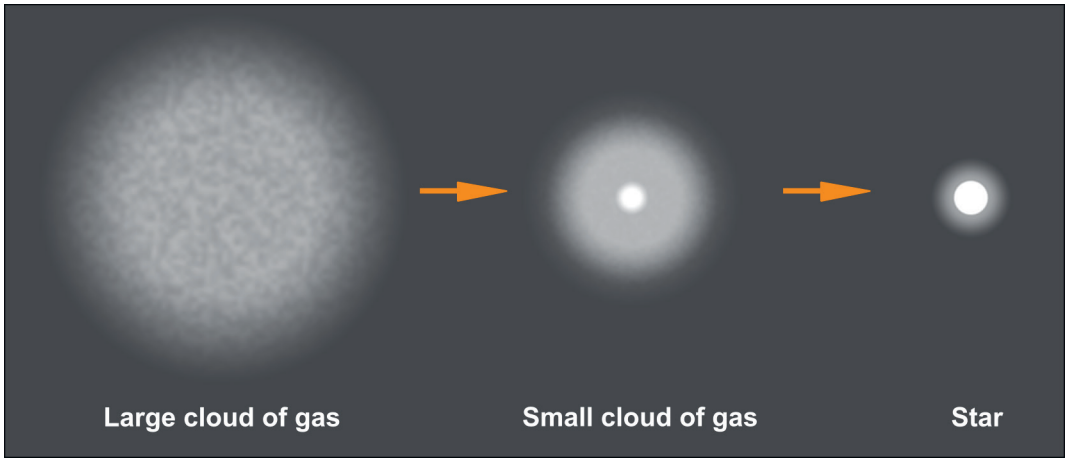
a) Each box has a correct alternative. Choose one correct alternative in each box.

Box 1	**A.** Through the Big Bang, matter was mostly transformed into energy. **B.** Through the Big Bang, energy was mostly transformed into matter.

Box 2	**C.** The universe is expanding and becomes larger. **D.** The size of the universe is constant.

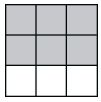
Stars are formed from large clouds of gas.

b) Explain how a star is formed from a cloud of gas.



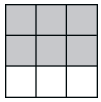
10. Fossil fuels in cars are being replaced more and more by other fuels, for example hydrogen gas. When the hydrogen gas is combusted in a car engine, energy and water is produced.

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

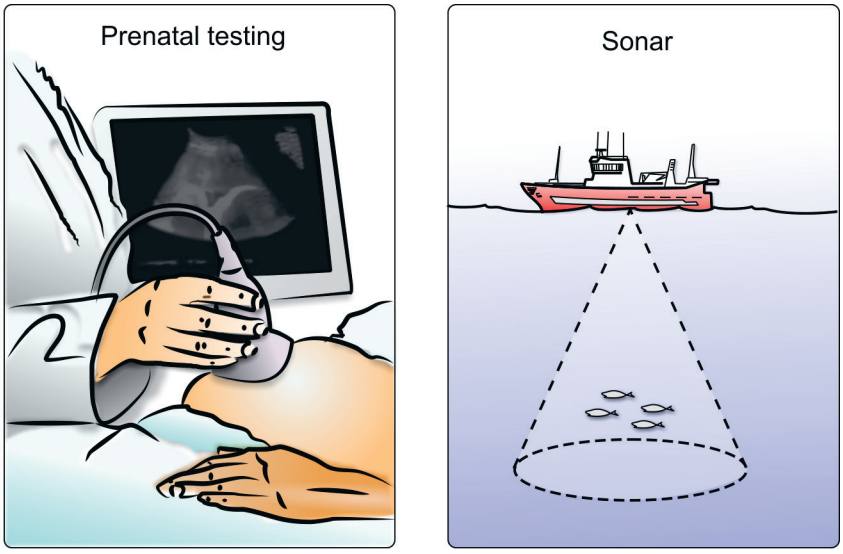


11. Radioactive waste from nuclear power plants has to be taken care of in a safe way. It can, for example, be stored in the bedrock. If the waste is not stored safely, it can influence living organisms in a negative way.

Start from two properties of radioactive compounds and explain why it is important to store radioactive waste in a safe way.



12. Ultrasound is sound with frequencies higher than 20 000 Hz. Humans cannot register ultrasound but it can still be used in different areas. Ultrasound can, for example, be used for prenatal testing and sonar.



Explain how the use of prenatal testing or sonar have influenced the living conditions

- of the individual

  and

- from a larger societal perspective.

UMEÅ UNIVERSITET

Institutionen för tillämpad utbildningsvetenskap