

# Physics

## Delprov A1

engelsk version

Årskurs

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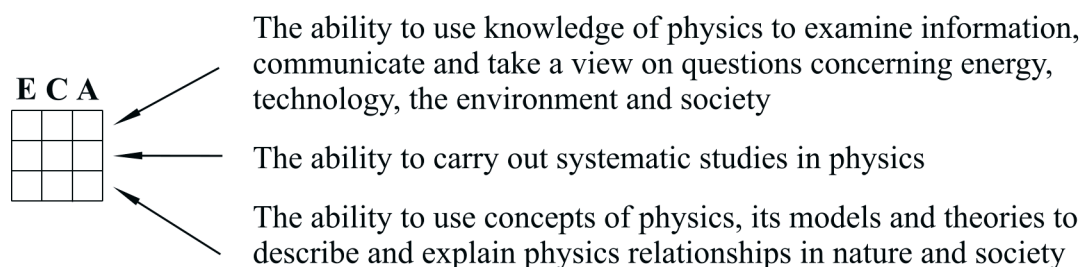
Elevens namn och klass/grupp



## NATIONAL TEST IN PHYSICS 2015

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.



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: \_\_\_\_\_

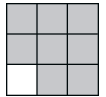
School: \_\_\_\_\_ Class: \_\_\_\_\_

Date of Birth: Year \_\_\_\_\_ Month \_\_\_\_\_ Day \_\_\_\_\_

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

1. In weather forecasts, different concepts are used.

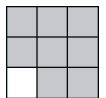
Match the concepts **1 – 4** to the right descriptions **A – D**.



- |                  |  |
|------------------|--|
| 1. Sea breeze    | <b>A.</b> Water vapour in the air close to the ground condenses and forms very small water droplets.                           |
| 2. Fog           | <b>B.</b> Cold air with high density that descends towards the ground.   |
| 3. Hail          | <b>C.</b> The air over land is heated faster than the air over the sea, which causes a wind to blow from the sea towards land. |
| 4. High-pressure | <b>D.</b> Supercooled water droplets colliding with snow crystals in clouds freeze and fall to the ground.                     |

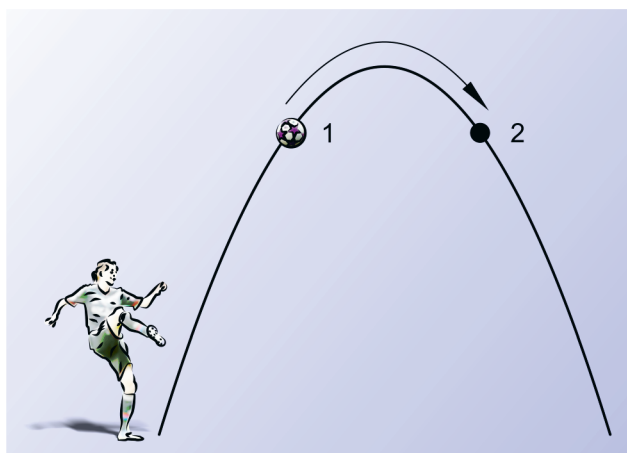
2. Jasmin is buying speaker cables. She knows that it is important that the cables can conduct high currents to get good sound quality. For this reason, Jasmin decides to buy speaker cables with low resistance.

Which speaker cable **A – D** should Jasmin choose if she wants her cables to have as low resistance as possible?

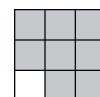


<b>A.</b> A long cable with large diameter.	
<b>B.</b> A short cable with large diameter.	
<b>C.</b> A long cable with small diameter.	
<b>D.</b> A short cable with small diameter.	

3. Lotta kicks a soccer ball into the air. The picture shows the trajectory of the soccer ball.

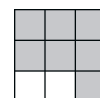


- a) Which one alternative **A – E** best describes the speed of the soccer ball while moving from point 1 to point 2?

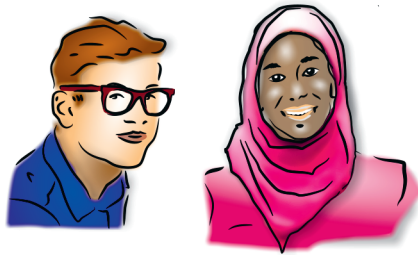


- A.** The speed of the ball is constant.
- B.** The speed of the ball increases all the time.
- C.** The speed of the ball decreases all the time.
- D.** The speed of the ball first increases and then decreases.
- E.** The speed of the ball first decreases and then increases.

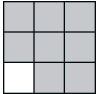
- b) Discuss how the height **and** the length of the trajectory of the soccer ball would change if there were no air resistance. Justify.



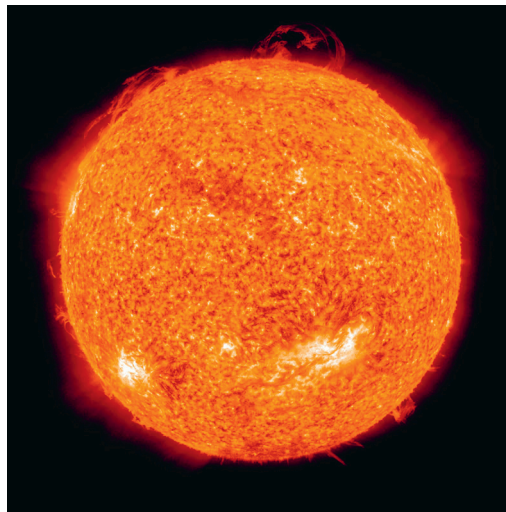
4. William has new glasses. He tells Vera that he can now see much better.



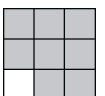
What happens with the light when it passes through the lens in William's glasses?



5. In the Big Bang, some 13.7 billion years ago, the basic elements of today started to form. In stars, basic elements with light nuclei fused, forming basic elements with heavier nuclei. This process is called fusion.

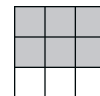


Give **one** example of a physical condition needed for fusion to take place.

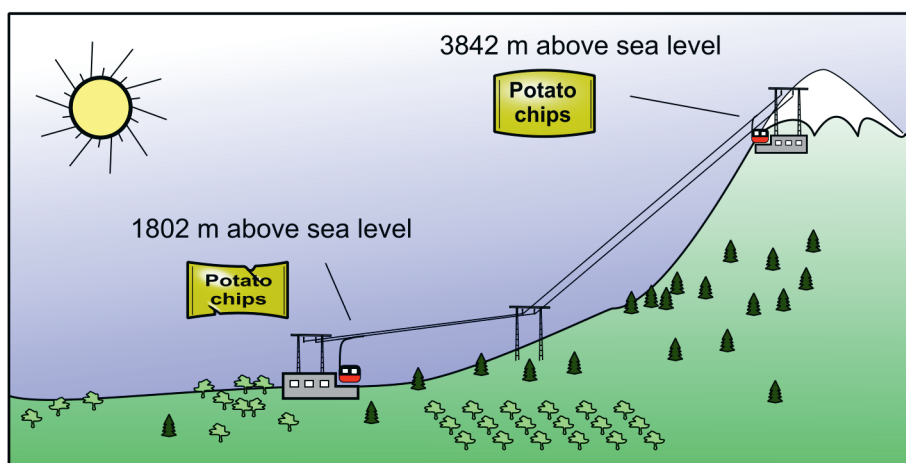


6. In a nuclear power plant, energy is extracted when nuclei are split. When the nuclei are split, nuclear waste is produced. In Sweden there is a proposal that nuclear waste should be placed in a repository in the bedrock for a long time. This proposal is based on knowledge of the properties of nuclear waste.

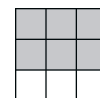
Give examples of **two** of the properties of nuclear waste **and** explain how these properties may have influenced the choice of repository.



7. Adriano is taking an aerial tramway to the top of a mountain. He has an unopened bag of potato chips in his backpack. When Adriano reaches the final stop, he removes the bag of potato chips from his backpack and discovers that it has expanded.



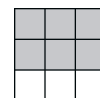
Explain why the difference in altitude makes the bag of potato chips expand.



8. The police can measure the speed of a car by means of laser. The laser device sends out several light pulses towards the car. With the help of the light pulses, the speed of the car can be calculated.

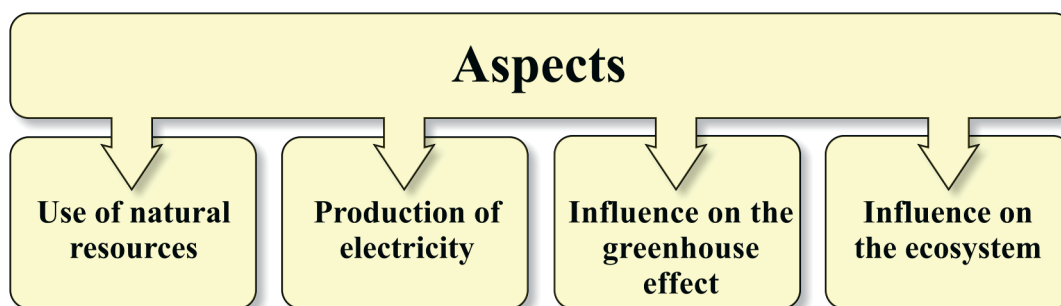


Use knowledge of the nature of light to explain how the speed of a car can be determined with the help of light pulses.

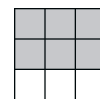


9. When the supply of crude oil decreases, the possibility of producing, for example, gasoline is more and more limited. This increases the need for other fuels for our cars. One such fuel is electricity. Electricity is produced by, for example, nuclear power, wind power, water power and coal power.

Imagine that all the cars in the world would run on electricity instead of gasoline. The change of fuel might, from different aspects, have environmental consequences.



Use **the different aspects** as a starting point and discuss what positive **and** negative consequences the change of fuel from gasoline to electricity could have for the environment.





10. Nanotechnology deals with changing substances at the atomic level, to give them new properties and uses.

The texts below are examples of how nanotechnology is used in different areas.

**Super steel**

Nanotechnology is used to make strong steel that doesn't break easily. This steel is used for example in very thin needles used in eye surgery.

**Stain resistant materials**

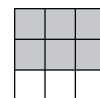
Stain resistant fabric is made with the help of nanotechnology. The molecules are ordered in such a way that drops of liquid do not easily penetrate the fabric.

**Microchips**

Nanotechnology is used to construct smaller and faster microchips. Microchips are used in electronic appliances, like mobile phones.

Use **one** of the three examples as a starting point and explain how the use of nanotechnology can affect the living conditions of humans.

State both an opportunity **and** a risk in your explanation.









Institutionen för tillämpad utbildningsvetenskap