

| | |
|-----------------------|--|
| Nyelvismeret 1 | Időtartam: a 3 feladat összesen 40 perc |
|-----------------------|--|

Complete the second sentence so that it has a similar meaning to that of the first one. Use the word given in brackets to complete the sentence. Sentence 0 is done for you as an example.
 No dictionary can be used.

- 0 The assistant still hasn't typed the report. (needs)
 The report
 The report still needs to be typed by the assistant.

| | | Score |
|-----|---|-------|
| 1. | The last time we had a blackout at the office was two years ago. (for) We | |
| 2. | If we don't improve the quality, we won't be able to sell our new product. (unless) We won't be able to sell | |
| 3. | They haven't finished reconstructing the plant by the deadline. (been) Reconstruction | |
| 4. | The instructions for use are so complicated that we don't understand them. (too) The instructions are | |
| 5. | I don't think you should ask him for advice, he has no experience at all. (use) It's | |
| 6. | I'm sure they have already repaired the broken machine. (must) They | |
| 7. | He wasn't promoted shop steward because he didn't have the right qualifications. (if) He'd have been promoted | |
| 8. | You should stay with this firm for another year. (would) If I | |
| 9. | Ford didn't sell as many cars as Toyota did in this country. (more) Toyota sold | |
| 10. | His duty is to supervise the assembly line. (responsible) He is | |

Nyelvismeret 2

Complete the text below by writing one suitable word in the space provided. The first one is done for you as an example (0) . You should write your answers into the box provided below. No dictionary can be used.

Shinkansen

At the 1964 Olympics, no sprinter could compete for attention with the newly opened Shinkansen, ... (0)... „bullet train,” which ran between Tokyo and Osaka at 125 miles an hour. A worldwide race to increase train speeds ... (1) ... been on ever since. France’s record -setting TGV operates at a top speed of 218 mph, but with the Fastech 360, East Japan Railway is ... (2) ... become the Jesse Owens of the railways. The company’s brand-new eight-car prototype, demonstrated for ... (3) ... first time this summer can reach speeds of ... (4) ... to 250 mph and will likely zip passengers between Tokyo and Aomori at 223 mph on a daily basis.

The improved performance depends primarily ... (5) ... sleeker aerodynamics and a more efficient connection ... (6) ... overhead power lines. But the viability of running a train at speeds faster than the average propeller plane also has much to do ... (7) ... innovations in safety and comfort. Most prominent of these are the peaked spoilers, ... (8) ... rotate out of the roof of each car and slow down the train in ... (9) ... of a calamity. Subtler safety features include heaters to prevent snow buildup under the carriage. The cars will tilt inward as the train turns corners to decrease the effect ... (10) ... centripetal force.

This fast train will be slow out of the starting gate – service starting in 2011 is the latest estimate.

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| | | Scores |
|---|-----------|--------|
| 0 | <i>or</i> | |
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |

| | | Scores |
|----|--|--------|
| 6 | | |
| 7 | | |
| 8 | | |
| 9 | | |
| 10 | | |

Nyelvismeret 3

Read the text below and fill each space with the word which best fits it. The first answer has been given as an example. No dictionary can be used.

An autonomous house

The energy crisis of the early 1970s led to a variety of projects in the ... (0) ... of „low-energy” houses. Some of these were just like ... (1) ... houses, but very heavily insulated. Others used relatively new devices such as solar collectors to ... (2) ... the „free” heat of the Sun. A few were radical ... (3) ... to make the house completely „autonomous” of all main services and reliant solely on the energy sources that were available ... (4) These sought to use wind or water for electricity, and often generated gas by methane generators using household wastes, while the water system might be planned to ... (5) ... as much as possible and collect whatever was needed from rain and dew.

One such building was a dome house in New Mexico. The dome is about 10m in diameter and is made of ... (6) ... steel segmental sections. It is lined internally with an 8cm sprayed ... (7) ... of flame-resistant polyurethane foam. Like an igloo, it has an airlock entrance tunnel to prevent heat ... (8)

Heating is provided by a hot-water radiator ... (9) ... around the base of the dome. Electricity for the pumps, lights and domestic appliances is provided from windmills and ... (10) ... in batteries. This house is entirely autonomous in energy terms.

Technology of Change The World of Science

Words to be used in the text

| | | Scores |
|---------------|-----------------|--------|
| absorb | 0 <i>design</i> | |
| coating | 1 | |
| conventional | 2 | |
| <i>design</i> | 3 | |
| experiments | 4 | |
| loss | 5 | |
| on site | 6 | |
| pressed | 7 | |
| recycle | 8 | |
| ring | 9 | |
| stored | 10 | |

You are going to read an article about the heat at the centre of the Earth. Some paragraphs are incomplete. Choose the most suitable piece of information from the list A - F and put them by the numbers of paragraphs 1 - 5. There is one extra statement which does not fit into any of the paragraphs. You can use your dictionary.

The burning question at the centre of the Earth

Earth's natural radioactivity has been measured for the first time. The measurement will help geologists find out to what extent nuclear decay is responsible for the immense quantity of heat generated by Earth.

Our planet's heat output drives the convection currents that churn liquid iron in the outer core, giving rise to Earth's magnetic field. (1) Measurement of the temperature gradients across rocks in mines and boreholes have led geologists to estimate that the planet is internally generating between 30 and 44 terawatts of heat.

..... (2) Based on studies of primitive meteorites known as carbonaceous chondrites, geologists have estimated Earth's uranium and thorium content and calculated that about 19 terawatts can be attributed to radioactivity. But until now there has been nothing definitive about exactly how much uranium there is in the planet, says geologist Bill McDonough of the University of Maryland in College Park. "There are fundamental uncertainties."

There is one way to lessen this uncertainty, and that is to look for antineutrinos. These particles are the antimatter equivalent of the uncharged, almost massless particles called neutrinos. (3) If antineutrinos are being created deep within the planet they should be detectable, because they can pass through almost all matter.

Now, the KamLAND antineutrino detector in Kamioka, Japan, has counted such antineutrinos. (4) They calculate that the nuclear reactions creating these particles could be generating as much as 60 terawatts, but are most likely putting out about 24 terawatts. "We have made the first measurements of the radioactivity of the whole of Earth," says John Learned, who heads the KamLAND group at the University of Hawaii in Manoa. The KamLAND group's finding is like unwrapping a birthday present, says McDonough.

With time, as more antineutrinos are detected, KamLAND may be able to determine once and for all whether radioactivity is entirely responsible for heating Earth or whether other sources, such as the crystallisation of liquid iron and nickel in the outer core, also play a significant role. "[Detecting anti-neutrinos] is the way of the future in terms of hard numbers about the system," says McDonough.

Antineutrinos could also reveal the radioactive composition of the crust and mantle, which will give geologists clues as to when and how they formed. (5) "We are heading towards doing neutrino tomography of the whole Earth," says Learned. "This is just the first step".

[NewScientist](#)

- A "The number of antineutrinos shows that nuclear reactions are probably generating about 24 terawatts of the Earth's heat".
- B An international team of scientists analysed the data and found about 16,2 million antineutrinos per square centimetre per second streaming out from Earth's core..
- C Some of this heat comes from the decay of radioactive elements.
- D But to do that, they will have to be able to pin down exactly where the antineutrinos are coming from, and this will require a whole network of detectors.
- E Just where this heat comes from is a big question.
- F They are released when uranium and thorium decay to form lead.

You have been asked by a colleague of yours, who does not speak English well, to summarise this article. *Read the article opposite and answer his questions in Hungarian. You can use your dictionary.*

To conquer Venus, try a plane with a brain

Crushing atmospheric pressures, fierce winds, baking temperatures and acidic clouds have quickly destroyed every probe or lander ever sent to Venus. So the prospect of emulating the spectacular success of NASA's Mars rovers Spirit and Opportunity on Venus might seem bleak. But there is hope. Space scientists in the US believe a solar-powered aircraft could explore the atmosphere of the second rock from the sun, and carry a flying "brain" to control a toughened rover on the ground.

A team led by Geoffrey Landis of NASA's Glenn Research Center in Ohio says that an autonomous solar-powered aircraft could cruise between different altitudes and locations in Venus's wild atmosphere, making measurements and radar-imaging the surface at 10 times the resolution possible with an orbiting craft. They say this would provide far better data than the Soviet and US probes of the 1970s and 1980s, which were only able to make atmospheric measurements for a short time as they descended to their doom in the planet's violent, corrosive winds.

But the planet's dense atmosphere is ideal for a flying craft. The aircraft fits within a 13-metre-diameter aeroshell – the same size as the successful small atmospheric probes used in the Pioneer Venus mission. The plane is released as the probe enters the atmosphere of Venus. The craft is designed to fit inside the aeroshell with as few folding parts as possible. Just two folds unfurl to produce the wings, and the tail extends, rather than unfolds. The aircraft is essentially a flying wing that has a small control surface. The flyer could glide indefinitely at an altitude of 50 kilometres above the surface of Venus. Solar panels on the craft's surface could absorb large amounts of the intense solar energy, powering motors to allow the craft to fly continuously. And the planet's slow rotation, with one day and night on Venus taking 117 Earth days, means a solar flyer could stay on the daylight side indefinitely.

NASA is particularly interested in studying a

fast-moving cloud band that stretches around the planet at an altitude of 50 to 75 kilometres. This band is an enigma. Amazingly, it spins 60 times faster than Venus itself, taking only four Earth days to circumnavigate the planet. "We really want to know how solar energy moves that upper atmosphere so very fast," Landis says. By cruising between the cloud base and cloud tops, where the temperature is a moderate 100 °C, a rover undertaking geological and imaging work would not last long. "We think we can get electrical things like motors and transistors to work at those temperatures, but not the microelectronics for computers," says Landis, who is also part of the science team running the Spirit and Opportunity missions.

His answer is to land a relatively dumb rover on the surface – which would be heat-proof, acid-proof and pressure-proof. The microchips that control the rover's motion, communication and imaging would be housed on the solar-powered flyer 50 kilometres above. "With no vulnerable on-board computer, we might then be able to duplicate the Spirit and Opportunity missions," Landis says. The down side would be the delay while the flying computer relays data to or from the dumb rover via a radio link.

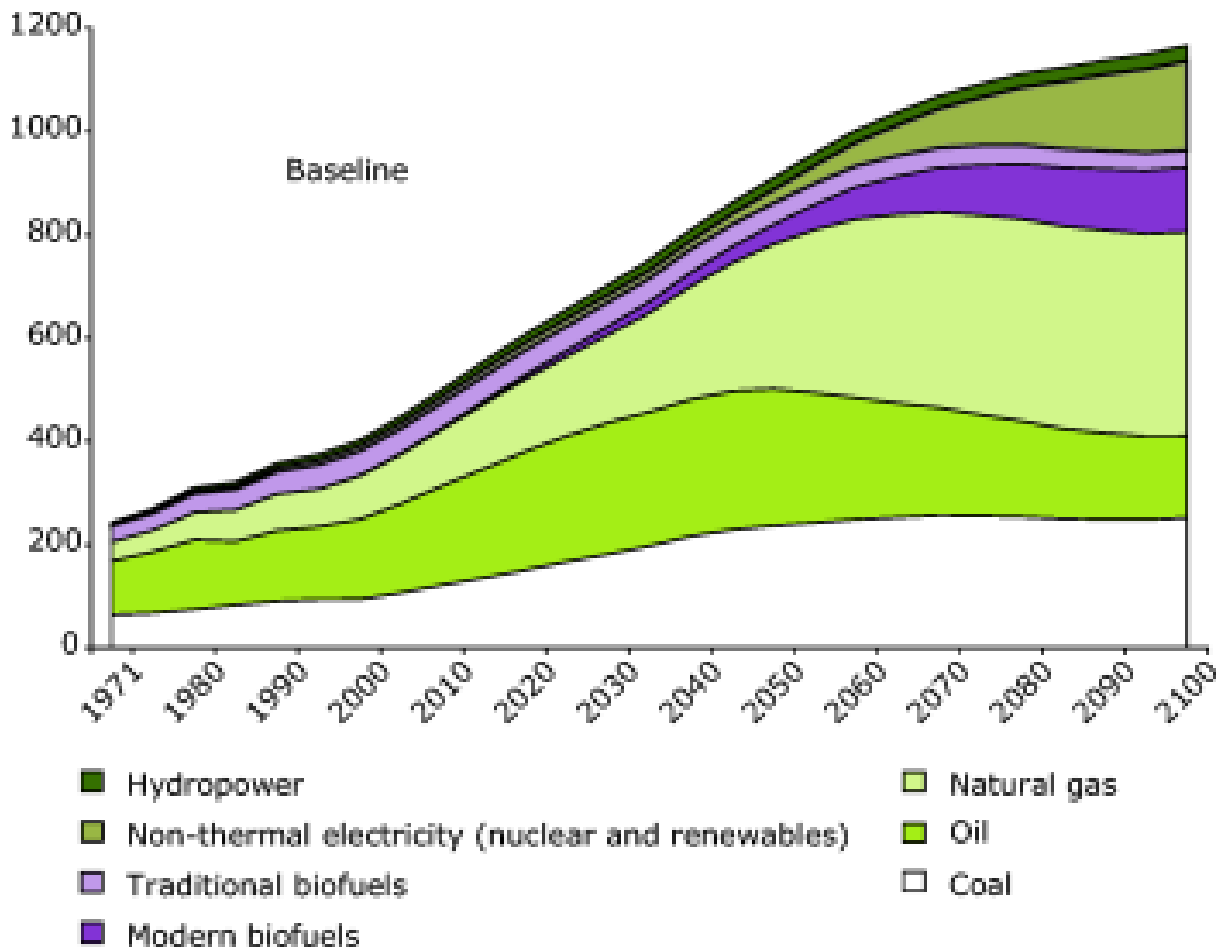
Funding for such ambitious schemes is uncertain, with NASA having only recently acquired new administrator Michael Griffin. However, others welcome the idea of using an aircraft for atmospheric analysis on Venus. "An in situ mission in the clouds of Venus would be very welcome," says Colin Wilson of the University of Oxford, an expert in atmospheric dynamics with the European Space Agency's Venus Express mission, which launches in October.

Venus Express is a duplicate of ESA's Mars Express orbiter, which has sent back stunning images of the Martian surface. The new orbiter will use infrared instruments to study the deep atmosphere of Venus. "But we won't know exactly what's going on in the clouds without in situ measurements," says Wilson.

| | Scores |
|--|--------|
| 1) Miért nem sikerültek a Vénusz vizsgálatát célzó eddigi kísérletek? | |
| 2) Mi lett a sorsuk a legkorábbi szovjet és amerikai expedícióknak? | |
| 3) Mi teszi kívánatossá repülő szerkezet alkalmazását? | |
| 4) Mi működteti a gépet? | |
| 5) Miért tud folyamatosan világosban dolgozni a szerkezet? | |
| 6) Mi a Vénusszal kapcsolatos legizgalmasabb rejtély? | |
| 7) Miért nem lehet a mikroelektronikát a bolygó felszínén működtetni? | |
| 8) Hogyan kívánják megoldani a fent említett problémát? | |
| 9) Milyen fogadtatásban részesült az új elképzelés? | |
| 10) Miért nem elégszenek meg a tudósok a Vénusz Express felbocsátásával? | |

The graph shows the past of and predictions for the global development in energy use in the world. Write a short analysis in which you describe the tendencies and reflect on why they might take place. (150-200 words)
Write to an expert audience. You can use your dictionary.


TWh



| Assessment Criteria | Points max | Points |
|---------------------|------------|--------|
| Communicative value | 10 (5x2) | |
| Expressiveness | 5 | |
| Accuracy | 5 | |
| Overall impression | 5 | |
| Total : | 25 | |


Write a letter of application. Give reasons why you would like to get the job, describe your background, skills and experience.
Use the conventions of a formal letter (100-120 words) You can use your dictionary.


IEEE-USA/AAAS Mass Media Science and Engineering Fellows Program




U.S. IEEE student members can help strengthen connections between engineers and journalists by working for 10 weeks during the summer as reporters, researchers and production assistants in newsrooms across the country. The goal is to increase public understanding and awareness of science and engineering.

To apply, you must be at least a junior in college majoring in a technical field, mathematics or social sciences. A weekly stipend of \$450 is provided.







| Assessment Criteria | Points max | Points |
|---------------------|------------|--------|
| Communicative value | 5 | |
| Vocabulary | 5 | |
| Accuracy | 5 | |
| Total : | 15 | |