

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ**  
**НАЦІОНАЛЬНИЙ АВІАЦІЙНИЙ УНІВЕРСИТЕТ**  
**Факультет лінгвістики та соціальних комунікацій**  
**Кафедра англійської філології і перекладу**

**МЕТОДИЧНІ РЕКОМЕНДАЦІЇ СТУДЕНТАМ**  
**З ПІДГОТОВКИ ДО ПРАКТИЧНИХ ЗАНЯТЬ**  
**з дисципліни «Практика перекладу галузевої літератури (3 курс)»**

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Матеріали до практичних  
занять розглянуті та схвалені  
на засіданні кафедри англійської філології і  
перекладу  
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Основною метою дисципліни є всебічний розвиток компонентів перекладацької комунікативної компетенції задля виконання різноспрямованих за цільовою мовою (українська та англійська) форм та видів галузевого перекладу, розгалужених за ситуаціями письмової мовленнєвої діяльності перекладача як комуніканта-посередника.

Засвоєння граматичних проблем перекладу передбачає опанування таких тем: переклад присудка, переклад підмета, переклад додатка, переклад детермінантів речення, переклад обставини, переклад означення, передача значень синтаксичних конструкцій, морфологічні труднощі.

Переклад галузевих текстів передбачає отримання навичок відтворення науково-технічних текстів з тем: «Екологія», «Захист довкілля» «Сільське господарство», «Біологія», «Будівництво», «Техніка безпеки на виробництві», «Історія», «Лінгвістика», «Економіка», «Інженерія», «Соціологія», «Анатомія», «Медицина», «Аерокосмічна медицина», «Військові технології» «Теорія ігор» (засвоєння термінології, вивчення лексичних, граматичних та стилістичних особливостей таких текстів).

Для перекладу та лінгвістичного аналізу текстів студенти можуть користуватись словниками за посиланнями: <https://www.multitran.com/>, <https://dictionary.cambridge.org/ru/> <https://www.merriam-webster.com/>.

### Матеріали до практичних занять 1-3

1. Переклад текстів з теми: «Анатомія», «Теорія ігор».
2. Переклад підмета

#### 1. Translate the text into English

- Цікаві факти з анатомії людини
- Кістки людини на 50% складаються з води.
- У тілі дорослої людини близько 75 кілометрів нервів.
- Нігті на пальцях руки ростуть приблизно в 4 рази швидше, ніж на ногах.
- Люди із блакитними очима більш чутливі до болю, ніж всі інші.
- Шлунковий сік людини містить 0,4% соляної кислоти (HCl).
- Чоловіки приблизно в 10 разів частіше жінок страждають дальтонізмом.
- 36 800 000 – кількість серцебиттів у людини за один рік.
- Людське волосся товстіше мильної плівки приблизно в 5000 разів.
- Нервові імпульси в людському тілі переміщуються зі швидкістю приблизно 90 метрів у секунду.
- Людське тіло містить стільки ж жирів, скільки потрібно для виробництва 7 шматків мила.
- При народженні в тілі дитини близько 300 кісток, у дорослому віці їх залишається всього 206.
- В організмі людини близько 2000 смакових рецепторів.
- Найдужчий м'яз у людському організмі – язик.
- Найдрібніші клітини в організмі чоловіка – клітини сперми.
- Жінки моргають приблизно в 2 рази частіше, ніж чоловіки.
- У хребті людини 33 або 34 хребця.
- Чхнути з відкритими очима неможливо.

- У роті людини близько 40 000 бактерій.
- Людське око здатне розрізнити 10 000 000 колірних відтінків.
- За все життя жіночий організм відтворює 7 мільйонів яйцеклітин.
- Доросла людина робить приблизно 23 000 вдихів (і видихів) за день.
- Права легеня людини вміщає в собі більше повітря, ніж ліва.
- У людини приблизно 2 мільйони потових залоз. Середня доросла людина з кожним літром поту губить 540 калорій. Чоловіки потіють приблизно на 40% більше, ніж жінки.
- Тонка кишка людини при житті має довжину близько 2,5 метрів. Після її смерті, коли мускулатура стінки кишки розслаблюється, її довжина досягає 6 метрів.
- З моменту народження в мозку людини вже існує 14 мільярдів клітин, і число це до самої смерті не збільшується. Навпаки, після 25 років воно скорочується на 100 тисяч в день. За хвилину, витрачену вами на читання сторінки, вмирає близько 70 клітин. Після 40 років деградація мозку різко прискорюється, а після 50 нейрони (нервові клітки) висихають і скорочується обсяг мозку.
- Площа поверхні людських легенів приблизно дорівнює площі тенісного корту.
- Діти народжуються без колінних чашечок. Вони з'являються тільки у віці 2-6 років.
- У головному мозку людини за одну секунду відбувається 100 000 хімічних реакцій.
- Загальна вага бактерій, що живуть в організмі людини, становить 2 кілограми.
- Людський мозок генерує за день більше електричних імпульсів, ніж всі телефони світу разом взяті.
- Розмір серця людини приблизно дорівнює величині його кулака. Вага серця дорослої людини становить 220-260 гр.
- Кожен палець людини за час життя згинається приблизно 25 мільйонів разів.
- Лейкоцити в організмі людини живуть 2-4 дня, а еритроцити – 3-4 місяця.
- Людська ДНК містить близько 80 000 генів.
- При посмішці в людини “працює” 17 мускулів.
- У блондинів борода росте швидше, ніж у брюнетів.

## 2. Translate the text into Ukrainian

### Muscles and Bones

Muscles and Bones provide the framework for our bodies and allow us to jump, run or just lie on the couch. Here are a few facts to ponder the next time you're lying around.

1. It takes 17 muscles to smile and 43 to frown. Unless you're trying to give your face a bit of a workout, smiling is a much easier option for most of us. Anyone who's ever scowled, squinted or frowned for a long period of time knows how it tires out the face which doesn't do a thing to improve your mood.

2. Babies are born with 300 bones, but by adulthood the number is reduced to 206. The reason for this is that many of the bones of children are composed of smaller component bones that are not yet fused like those in the skull. This makes it easier for the baby to pass through the birth canal. The bones harden and fuse as the children grow.

3. We are about 1 cm taller in the morning than in the evening. The cartilage between our bones gets compressed by standing, sitting and other daily activities as the day goes on, making us just a little shorter at the end of the day than at the beginning.

4. The strongest muscle in the human body is the tongue. While you may not be able to bench press much with your tongue, it is in fact the strongest muscle in your body in proportion to its size. If you think about it, every time you eat, swallow or talk you use your tongue, ensuring it gets quite a workout throughout the day.

5. The hardest bone in the human body is the jawbone. The next time someone suggests you take it on the chin, you might be well advised to take their advice as the jawbone is one of the most durable and hard to break bones in the body.

6. You use 200 muscles to take one step. Depending on how you divide up muscle groups, just to take a single step you use somewhere in the neighborhood of 200 muscles. That's a lot of work for the muscles considering most of us take about 10,000 steps a day.
7. The tooth is the only part of the human body that can't repair itself. If you've ever chipped a tooth you know just how sadly true this one is. The outer layer of the tooth is enamel which is not a living tissue. Since it's not alive, it can't repair itself, leaving your dentist to do the work instead.
8. It takes twice as long to lose new muscle if you stop working out than it did to gain it. Lazy people out there shouldn't use this as motivation to not work out, however. It's relatively easy to build new muscle tissue and get your muscles in shape, so if anything, this fact should be motivation to get off the couch and get moving.
9. Bone is stronger than some steel. This doesn't mean your bones can't break of course, as they are much less dense than steel. Bone has been found to have a tensile strength of 20,000 psi while steel is much higher at 70,000 psi. Steel is much heavier than bone, however, and pound for pound bone is the stronger material.
10. The feet account for one quarter of all the human body's bones. You may not give your feet much thought but they are home to more bones than any other part of your body. How many? Of the two hundred or so bones in the body, the feet contain a whopping 52 of them.

**3. Give the names to the following definitions. In the list below, you will find tips. Not all of the terms will be required.**

*(Autonomic nervous system, sympathetic nervous system, parasympathetic nervous system, circulatory system, vertebrate anatomy, glands, involuntary muscles, hormone production, vertebral column, coeliac ganglion, spinal cord, cranial nerves, the vagus, accessory nerves, plexus, nerve innervation, pelvic ganglion, rectum, bladder, genital organs.*

1. This course is designed to provide students a broad understanding of the anatomy of vertebrates with an emphasis on comparison between taxa and their evolutionary significance.
2. These muscles are not controllable consciously, and instead contract due to unconscious impulses sent by the autonomic nervous system or certain specialized cells or hormones.
3. This system allows the body to adjust in stressful situations, such as those that arouse excitement, fear, anger, and embarrassment. This is the reason why it is also called the "fight-or-flight system." It increases [heart rate](#), dilates the respiratory bronchioles to increase uptake of [oxygen](#), and dilates blood vessels to increase blood supply to the skeletal muscles.
4. This is an essential part of human anatomy. It extends from the brain, down the back, and acts like a highway for information that travels to and from the brain. Injury or damage to this part can result in serious problems such as bowel dysfunction, and inability to breathe.
5. This system controls feeding, breeding, and resting functions. It decreases heart rate, facilitates the release of digestive enzymes, and stimulates the processes of urination and defecation. The opposing functions explain why a person cannot urinate, defecate, or digest properly when encountering stressful situations.
6. These are 12 pairs of nerves that emerge from the brain stem to innervate various areas of the face and some other regions of the body. The face needs to be capable of a number of different movements which require precision and control, making it necessary to have numerous nerves to handle different types of movements. These nerves fit through several

holes in the skull that have been specifically designed to accommodate them; the holes can be seen when a person closely examines a skull.

7. This is one of the cranial nerves, and its purpose is to innervate the organs of the body, known collectively as the viscera. Specifically, the function of this nerve is to relay signals between the brain and various body systems to regulate heart rate, speech, sweating, blood pressure, digestion, glucose production, and certain aspects of breathing. Not only is the nerve responsible for innervating organs, but it also controls certain skeletal muscles, such as the larynx.
8. This organ is located in the lower abdomen. In men it is directly in front of the prostate, which is why an enlarged prostate can lead to problems urinating. In women, it is placed between the vagina and the uterus, which explains why a pregnant woman is often very sensitive as her unborn child grows larger.
9. It is a term used to describe the distribution of nerves across the body and to particular areas, along with the supply of nerve impulses.
10. It is an integral part of the nervous system where nerves are bunched together in small groups. These nerve clusters connect the peripheral and central nervous systems, allowing electrical signals to travel from the brain and spinal cord to the rest of the body. Without these connecting bundles the brain would not be able to communicate with the rest of the body.

**4. Match the words from the left- hand column with the definitions form the right-hand column.**

- |                              |   |
|------------------------------|---|
| <b>1) vertebrate anatomy</b> | a) elongated nerve bundles that lie in the vertebral canal and from which the spinal nerves emerge.   |
| <b>2) dilate</b>             | b) to reduce in size by drawing together; shrink.   |
| <b>3) ganglia</b>            | c) the terminal portion of the large intestine, extending from the sigmoid colon to the anal canal.   |
| <b>4) accessory nerve</b>    | d) the organs involved in the formation and excretion of urine together with those involved in sexual reproduction. Also called genitourinary system. |
| <b>5) spinal cord</b>        | e) to make wider or larger; cause to expand   |
| <b>6) cranial nerves</b>     | f) organs or structures that secrete a substance.   |
| <b>7) urogenital systems</b> | g) studies the anatomy of birds, mammals, dinosaurs, fish, reptiles   |
| <b>8) innervate</b>          | h) groups of nerve cell bodies within brain or spinal cord  |

- 9) **rectum** i) a nerve of the neck, essential for speech, swallowing, and certain movements of the head and shoulders.
- 10) **smooth muscles** j) to supply (an organ or a body part) with nerves.
- 11) **glands** k) (anatomy) muscle that is capable of slow rhythmic involuntary contractions: occurs in the walls of the blood vessels, alimentary canal
- 12) **contract** l) the set of twelve nerves found on each side of the head and neck that control the sensory and muscle functions of a number of organs such as the eyes, nose, tongue face and throat.

### 5. Read the text and find the words for the definitions below the text.

Smile muscles include the zygomaticus major and the zygomaticus minor, which are the muscles that pull up the corners of your lips when you smile. They're also important for chewing, talking, and pursing your lips. Strengthening these muscles can help to keep your skin taut and slow the signs of aging, such as wrinkles and droopiness, on the lower face. Smile muscle exercises are generally easy to perform at home without special training or equipment. There are a number of smile muscle exercises you can choose to help build facial muscles.

One of the easiest ways to build smile muscles may be to practice smiling. Experts generally recommend stretching the mouth into the widest possible smile. The smile should ideally be held for a count of five seconds. Repeating the exercise 10 to 12 times per session can help build the facial muscles responsible for smiling. Some fitness experts recommend performing this smile muscle exercise while pressing down on the balls of the cheeks with one to three fingers of each hand, in order to add some resistance and build stronger muscles.

Smile muscles can also benefit from the lip pucker exercise. For this exercise, experts often recommend puckering the lips firmly, then pulling them back into the mouth so that they wrap over the teeth. You may benefit from holding this position for a count of ten seconds and repeating it five to six times per exercise session.

To work on the facial muscles of the cheeks, keep your lips together while opening your jaws slightly. Suck the cheek flesh in between the teeth, as if you were making a fish face. Hold the cheek flesh between the jaws for a ten-second count, while being careful not to bite yourself. Fitness experts generally advise repeating this exercise five to six times.

Building smile muscles can also involve stretching and toning facial muscles, notably in the cheeks. Closing the mouth with some air still inside it, and forcing that air first into one cheek, then the other, and then into first the upper and then the lower lip, can help to stretch and tone the smile muscles in the cheeks. The air should ideally be held firmly in each location for a count of ten seconds, and most experts advise repeating this exercise at least five times per session.

Closing and opening your mouth widely for 10 to 12 repetitions can also help stretch and tone the smile muscles. Hold the mouth open as far as possible for a count of five seconds, and then rest for a five-second count after closing the mouth.

zygomaticus major – великий відросток виличної кістки

to purse – стискати

taut – пружний

droopiness – відвислість

lip pucker – витягувати губи для поцілунку

Find the words for the following definitions

1. Make more forceful, powerful
2. Tightly stretched; tense
3. Lacking in strength or firmness or resilience; bending or hanging downward
4. A facial expression in which the lips are tightly pulled together and pushed outward
5. The soft tissue of the body of a vertebrate, covering the bones and consisting mainly of skeletal muscle and fat
6. Either of two bony structures that in most vertebrates form the framework of the mouth and hold the teeth
7. To lengthen, widen, or distend

## 6. Translate the following text into Ukrainian.

**Теорія ігор** – розділ прикладної математики, який вивчає математичні моделі прийняття рішень у так званих конфліктних ситуаціях, що мають місце. Основоположниками теорії ігор є математик Дж. Фон Непман та економіст О. Моргенштерн. Сутність теорії ігор полягає у встановленні оптимальної (у тому чи іншому змісті) стратегії поведінки в конфліктних ситуаціях. Метою теорії ігор є визначення оптимальної стратегії для кожного гравця.

Стратегією гравця називається сукупність правил, що обумовлюють вибір його дій при кожному особистому ході залежно від наявної ситуації.

Ігри різняться за числом учасників, характеристиками так званих платіжних функцій, які визначають вигравш кожного гравця залежно від його поведінки і поведінки інших учасників конфлікту, за інформацією про ситуацію, що склалася та яка є в розпорядженні партнерів, за правилами, що обмежують вибір лінії поведінки учасників, за можливостями укладання угод між ними і входження в коаліції, за визначенням поняття "рівноваги" чи "справедливого вирішення гри".

Складовою теорії ігор виступає статистична теорія ігор. Це розділ сучасної прикладної математики, який вивчає методи обґрунтування оптимальних рішень в конфліктних ситуаціях.

У теорії статистичних ігор наявні такі поняття як вихідна стратегічна гра і власне статистична гра. В цій теорії першого гравця називають природою, вкладаючи в це поняття сукупність обставин, в яких доводиться приймати рішення другому гравцю, якого називають статистиком.

Якщо вигравш одного гравця дорівнює програшу іншого, то гра називається антагоністичною або грою з нульовою сумою. У процесі гри її учасники здійснюють ходи. Ходом гравця називається вибір та здійснення однієї із передбачених правилами дій.

Ходи бувають двох видів: особисті та випадкові. Особистий хід – це свідомий вибір гравцем одного з можливих варіантів дій. У подальшому ми будемо розглядати тільки особисті ходи гравців. Випадковий хід – це випадково вибрана дія.

Для того, щоб вирішити гру, або знайти рішення гри необхідно для кожного гравця вибрати стратегію, яка б відповідала умові оптимальності. Це означає, що один із гравців повинен одержати максимальний вигравш, у той час як другий дотримується своєї стратегії. Такі стратегії називаються оптимальними.

Оптимальні стратегії мають також відповідати умові стійкості, тобто будь-кому з гравців повинно бути не вигідно відмовитися від своєї стратегії у цій грі.

Якщо гра повторюється багато разів, то тоді гравців може цікавити не вигравш і програш кожного разу в кожній конкретній партії, а середній вигравш (прогреш) в усіх партіях.

## 7. Give the words to the following definitions.

- A feeling of delight at being entertained, an activity that is diverting and that holds the attention;
- a checkerboard game for two players who each have 12 pieces; the object is to jump over and so capture the opponent's pieces;
- The stake that each poker player must put into the pool before receiving a hand or before receiving new cards;
- cubes of wood, plastic, etc, each of whose sides has a different number of spots (1 to 6), used in games of chance and in gambling to give random numbers;
- a game in which two players alternately put crosses and circles in one of the compartments of a square grid of nine spaces; the object is to get a row of three crosses or three circles before the opponent does;
- A game, usually played for money or stakes, in which the winner is determined by a chance event, as by drawing numbers or throwing dice;
- A written description of the standard method used by a worker, player to guide his activities;
- financial return or reward (especially returns equal to the initial investment);
- a calculation involving numbers or quantities;
- an informal indoor game; parlor game

## 8. Translate sentences into Ukrainian.

1. Гра з повною інформацією – така гра, ходи якої відомі всім учасникам, що дозволяє передбачити хід гри.
2. Екстенсивна форма гри передбачає вибір кожним гравцем оптимальної стратегії, яка призводить до кінцевого результату.
3. Виграш чи виплата – це термін з теорії гри, який відбувається в кінці гри.
4. В покері чи інших азартних ситуаціях, виграшем є сума грошей, визначена першою ставкою чи іншими ставками під час гри, який обчислюється на основі імовірності виграшу.
5. Прикладом екстенсивної гри є шашки, хрестики-нулики, а також картярські ігри – скриньки та кункен.
6. Стратегія, яка враховує всі можливі ходи є планом, який не можна порушити за будь-яких умов гри.
7. Ходи здійснюються за особистим вибором чи випадково. В останньому випадку використовується кубик, картка з командою чи цифрове колесо, яке визначає хід, імовірність якого можна обчислити.
8. Аспекти теорії гри були вперше досліджені французьким математиком Емілем Борелем, який написав кілька статей про теорію гри.
9. Перелік правил встановлює умови за якими починається гра, можливі дозволені ходи на кожному етапі гри, загальну кількість ходів, що складають гру та умови виграшу в кінці.
10. Військові стратеги у сферах логістики та підводної війни, висувають ідеї безпосередньо пов'язані з теорією гри.

**Вибіркові завдання та тексти для перекладу для виконання під час практичних занять з дисципліни**

**Grow your own clothes**



## I. VOCABULARLY

consumable product - витратний матеріал  
fermentation process - процес бродіння  
cellulose ['seljʊləʊs] - целюлоза  
thermostat ['θə:məstæt] термостат

rescue ['reskjʊ:] - рятувати  
brew [bru:] - варити  
acetic acid [ə'si:tɪk 'æsɪd] - оцтова кислота  
evaporate [ɪ'væpəreɪt] - випаровуватися

## II. FILL IN THE BLANKS WITH THE NECESSARY VERBS:

1. I \_\_ up to about 30 liters of tea at a time, and then while it's still hot, add a couple of kilos of sugar. 2. We \_\_ this in until it's completely dissolved and then pour it into a growth bath. 3. And once you get this process going, you can actually \_\_ your previous fermented liquid. 4. We need to \_\_ an optimum temperature for the growth. 5. After about three days, the bubbles will \_\_ on the surface of the liquid.

*maintain, brew, stir, appear, recycle.*

## III. TRANSLATE INTO UKRAINIAN:

1. And when it's ready to harvest, you take it out of the bath and you wash it in cold, soapy water. 2. And then you can either cut that out and sew it conventionally, or you can use the wet material to form it around a three-dimensional shape. 3. I can make it change color without using dye by a process of iron oxidation. 4. So what I want to do is say to a future bug, "Spin me a thread. Align it in this direction. Make it hydrophobic. And while you're at it, just form it around this 3D shape." 5. Ultimately, maybe it won't even be fashion where we see these microbes have their impact.

## IV. TRANSLATE INTO ENGLISH:

1. Як дизайнер одягу я завжди думала про матеріали схожі на ці або ці чи можливо про такі. 2. І це статична культура. З нею не потрібно нічого робити; ти просто спостерігаєш як вона росте. Вона не потребує світла. 3. Мені здається, це трохи схоже на шкіру людини, і це мене інтригує. 4. Те що мене захоплює у використанні бактерій, це їхня ефективність. 5. Що б ви хотіли виростити у майбутньому?

## Crop insurance, an idea worth seeding

### I. VOCABULARLY

maize flower – кукурудза  
cob – качан кукурудзи  
drought – посуха  
confounded – збентежений, спантеличений;  
insurance – страхування  
loan – кредит  
launch – починати  
Grameen Bank – Сільський банк  
defiantly – зухвало  
uptick – поступальний рух  
premium – страховий внесок

finalize – оформляти (кредит)  
onset – початок  
shrivel – висихати, в'янути  
estimate – попередній підрахунок  
convince – переконувати, запевняти  
devise – винаходити; розробляти  
beneficiary – особа, яка виявилася у вигазі, для вигоди якої що-небудь відбувається  
germinate – проростати  
zoom out – збільшити масштаб зображення

## II. ANSWER THE FOLLOWING QUESTIONS ON THE TEXT:

1. What does gorogoro mean?
2. What is maize flower used for?
3. Where did the Rose Goslinga come from?
4. What made her decide to become an insurance agent?
5. What does traditional insurance rely on?
6. What does Rose Goslinga and her companions rely on?
7. How many days of rain do the farmers need to plant maize?
9. Who created the method of providing small loans to poor people?

## III. FILL IN THE BLANKS WITH THE NECESSARY VERBS:

1. She \_\_\_\_\_. an ambitious plan to start a green revolution in her country. 2. We \_\_\_\_\_ agronomic algorithms which tell us how much rainfall a crop needs and when. 3. They were all providing loans to farmers, and often, just before they'd \_\_\_\_\_ the loan, the farmer would say, "But what if it doesn't rain? 4. For the next three weeks, there wasn't a single drop of rain, and the crops that had \_\_\_\_\_ so well \_\_\_\_\_ and died. 5. So we \_\_\_\_\_ our insurance partners. 6. A satellite would then \_\_\_\_\_ the rainfall for the next three weeks, and if it didn't rain, we'd replace their seed.

*to shrivel, to launch, to convince, to measure, to devise, to finalize, to replace, to germinate.*

## IV. TRANSLATE INTO UKRAINIAN:

1. For credit, a farmer needs to earn the trust of a bank, and if it succeeds, the bank will advance him money. 2. We tried for some years selling insurance directly to farmers, with very high marketing cost and very limited success. 3. Most of the organizations, however, were limiting their growth in agriculture. 4. We took the idea of replanting to a seed company and convinced them to price the cost of insurance into every bag of seed, and in every bag, we packed a card that had a number on it, and when the farmers would open the card, they'd text in that number, and that number would actually help us to locate the farmer and allocate them to a satellite pixel. 5. We visited his farm later that August, and I wish I could show you the smile on his face when he showed us his harvest, because it warmed my heart and it made me realize why selling insurance can be a good thing. 6. They owned an average of half an acre and paid on average two Euros in premium.

## V. TRANSLATE INTO ENGLISH:

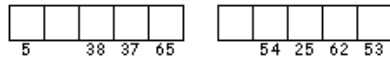
1. Це була і є одна з найжахливіших посух за всю історію країни. 2. Я з родини місіонерів, які побудували лікарні в Індонезії. 3. Цей знімок із супутника показує, де були хмари, а де ні. 4. Ці знімки показують початок сезону дощів в Кенії. 5. Але просто даних не достатньо. 6. Я справлявся так багато років. Навіщо мені купувати страховку зараз? 7. Це приваблива пропозиція. 8. Кілька років ми намагалися продавати страховку безпосередньо фермерам. 9. А якщо не буде дощу? Як я буду платити за кредитом? 10. Вони взяли кредити і засіяли ґрунт. 11. Не могли б ви видати гроші зараз? 12. Почекайте, я не закінчила! 13. Більше ніякого року однієї чашки.

## Ecology crossword

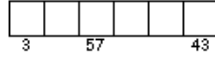
Unscramble each of the clue words.

Copy the letters in the numbered cells to other cells with the same number.

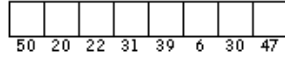
ZOEON ERALY



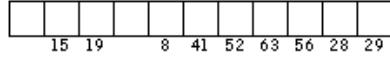
EGONXY



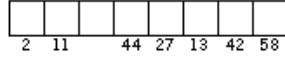
NONTIGRE



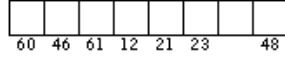
GENTIEFRER



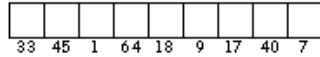
HAMLCICE



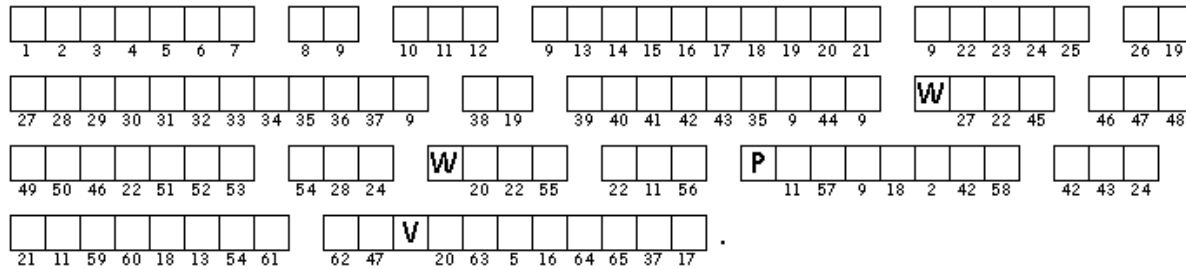
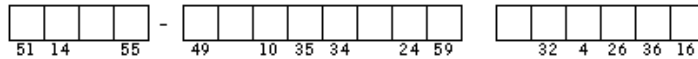
LCOLUEME



HRMYCSETI



HHGI-TAEDUITL BOLNOA



### The Future of Agriculture at Home and Abroad

Farming is remarkable work. We begin with the dirt, a seed or a sapling, a calf or baby chick. We nurture from well before sunup till after sundown. We face unpredictable challenges, and we keep looking for ways to do better. Few businesses begin every season back at square one, but that’s the cycle of agriculture. Few businesses have the well-being of so many riding on their success either. But farmers and ranchers rise to this challenge because we love what we do, and we want to ensure that our nation and our world continue to have access to a safe, sustainable food supply.

Farmers are not alone in taking on the challenge of feeding a booming population. Thanks to researchers and innovators, agriculture is more efficient than ever before. We have access to smarter tools—from tractors that can drive themselves to drones that can help monitor crop health down to the individual plant. We have better seeds that require less chemicals and are resistant to drought. We even have robots that can harvest crops, spray fields and milk cows.

Our farms today look a lot different than our grandparents’ and that’s a good thing. We should always be moving forward and doing better. It’s that drive to do better that has reduced our carbon footprint and made U.S. agriculture one of the smallest industry contributors to greenhouse gas emissions. We are using less water, energy and fertilizer – all because of the strides our nation has made in agricultural technology.

American agriculture has led the way in technology and innovation thanks to our national investment in research and development at our land-grant universities. Unfortunately, we have dropped off as the global leader in R&D investment in the last decade and are now outpaced by China. If the U.S. is going to stay competitive and hold our spot as the world’s leading agricultural producer, we must renew our commitment to investing in the research that has made our farms and ranches the most productive and sustainable in the world.

Advancing agriculture together for the good of everyone is what the World Food Prize is about, and I am excited to be in Des Moines, Iowa, this week to celebrate our shared goals across the food chain as we look to the future of agriculture. Together we can ensure farming survives and thrives in every corner of the earth. Leaders, scientists, entrepreneurs and innovators have been

gathering for more than three decades at this event because we all believe in agriculture's power to change the world. Countries that cannot feed themselves crumble, but modern farming methods and tools can promote sustainability and stability across the globe, making us all safer and more secure.

Farming and ranching are family and community businesses: We know we do better when everyone has a chance to succeed. We are committed to helping our neighbors near and far because we believe a hard day's work best begins with a hearty meal. We know firsthand the importance of sustainability because our families have been caring for the land for generations. And we want to see agriculture succeed around the world because we all depend on the remarkable work of farming for our livelihoods and our well-being.

*Vincent "Zippy" Duvall, a poultry, cattle and hay producer from Greene County, Georgia, is the 12th president of the American Farm Bureau Federation.*

### **What is aquaculture?**

Aquaculture is the farming of aquatic animals or plants principally for food. It includes the breeding, rearing, and harvesting of fish, mollusks, crustaceans, and plants in fresh and saltwater environments. The practice originated in China about 4,000 years ago, and global production continues to be dominated by China and other Asian countries. Aquaculture is used to produce food by some of the poorest communities around the globe as well as by major corporations.

Globally, aquaculture already supplies more than half of all seafood consumed by humans, a proportion that continues to rise as the world population grows. According to the Food and Agricultural Organization (FAO), 3 million tons of food were produced by aquaculture in the 1970s, a figure that rose steadily to over 80 million tons in 2017. Meanwhile, annual global fishing harvests have been flat for 40 years and are not expected to increase in the future.

More than 550 aquatic species are farmed. The top fish species include carp, catfish, salmon, and tilapia; commonly farmed shellfish include shrimp, oysters, clams, mussels, and scallops. Newer to marine farming are various species of seaweed, which total 27% of annual global aquaculture tonnage. Aquaculture also includes the production of fish for the aquarium trade and algae for the pharmaceutical, biotechnology (e.g., biofuels), and health industries. It is also used to replenish depleted fish stocks in the wild; the majority of "wild" Alaskan salmon come from hatcheries.

#### **Why is aquaculture important?**

Historically, freshwater aquaculture (particularly carp and catfish) has been and continues to be responsible for the majority of global production. Marine aquaculture is playing an increasingly important role for the planet as a food and potential energy source, especially as arable land and freshwater become increasingly scarce. Not only is aquaculture the most rapidly expanding sector of food production, it is one of the most resource-efficient ways to produce protein, according to NOAA. Marine aquaculture has already helped improve nutrition and food security in many parts of the world where wild fish stocks have collapsed.

Shellfish and seaweed aquaculture also provide valuable services to marine ecosystems and the planet. Shellfish and seaweeds absorb carbon dioxide rather than producing it like land-based livestock. In fact, dense seaweed farms can create a "halo-effect" around them that could help mitigate local ocean acidification. These forms of low-impact food production mitigate climate change while sustainably feeding future generations. For these reasons, environmental organizations such as the World Wildlife Fund and The Nature Conservancy actively champion shellfish and seaweed farming.

### **What should be done about plastic bags?**

The European Commission is to publish proposals in the spring designed to reduce the number of plastic bags used in Europe each year. Most of the 15,000 people who took part in a public consultation favoured an outright ban - but what are the options?

Every year 800,000 tonnes of so-called single-use plastic bags are used in the European Union - the average EU citizen used 191 of them in 2010, the Commission says, and only 6% were recycled.

More than four billion bags are thrown away each year.

"The impact of this plastic waste can be seen littering our landscape, threatening our wildlife and accumulating as 'plastic soup' in the Pacific Ocean, which may cover more than 15,000,000 sq km," says Environment Commissioner Janez Potocnik.

So what are the options for addressing the problem and where have they been tried?

Last year Italy became the first country in Europe to ban non-biodegradable plastic bags.

A number of countries have banned very thin plastic bags, including China, South Africa, Kenya, Uganda and Bangladesh - in Bangladesh's case, it was found that the bags had clogged up the drainage system, exacerbating deadly floods.

A handful of countries have banned plastic bags altogether, including Rwanda and Somalia, while some like Tanzania have banned ultra-thin bags.

The United Arab Emirates, concerned about pollution and the risk to camels and other animals, has banned all plastic bags except oxo-biodegradables.

British government minister Lord Henley said last year he was "not happy" the use of carrier bags in the UK had risen by 5% in 2010, after four years of decline. He suggested the UK might introduce a ban.

Friends of the Earth are in favour of this as long as alternatives are adequately highlighted, people and shopkeepers have enough time to prepare, and it does not have a "disproportionate impact on the poor".

If shoppers stop using plastic bags, they must start using other kinds of bags, but there is no perfect solution. Stronger, heavier bags, whether made of fabric or plastic, have a bigger environmental impact than standard supermarket shopping bags.

Last year Britain's Environment Agency published a Life Cycle Assessment of Supermarket Carrier Bags, which concluded that long-life bags have to be reused a number of times if they are to be environmentally a better option than standard plastic carrier bags.

For instance, if a plastic bag is used just once, then a paper bag must be used three times to compensate for the larger amount of carbon used in manufacturing and transporting it, a plastic "bag for life" must be used four times, and a cotton bag must be used 131 times.

If a plastic bag is reused, of course, then its carbon footprint per use decreases further - and the number of times the alternatives have to be used to match this low footprint is multiplied.

### **Methods of House Construction**

Different methods of house construction not only impact the cost and design of your home, but also affect the maintenance requirements and long-term value of your property. The choice of construction method even impacts your home's energy efficiency, which can influence both the environment and your monthly energy bills. When deciding among construction techniques, take the time to balance long-term sustainability with up-front and lifetime costs to find the best home design for your needs.

#### **Wood Framing**

Wood framing represents the most common method of house construction. It consists of wooden beams and lumber components connected using nails or screws to form walls, floors, roofs and ceilings. Many people choose wood framing because of its low cost and design versatility, while others choose it simply because it's fairly easy to construct. One of the drawbacks of wood is its tendency to suffer moisture damage in the form of rot, swelling or mold. Wood is also a relatively poor insulator and offers little protection against noise, storms and wind.

#### **Steel Framing**

Light-gauge steel framing is similar to wood framing but offers long-term durability and fewer flaws. According to the LSU Agricultural Center, steel framing costs more than wood but features a uniform, predictable finish that results in straighter walls and more tightly constructed homes. Because steel framing is still relatively uncommon in residential construction, it may be challenging to find a skilled builder to construct your home using this method.

#### **Masonry**

Masonry homes include those built from block, stone or brick. Block often serves as a basic framing material in areas subject to storms or high winds that would be too damaging for wood or steel framing. Its heavy weight provides strength and durability as well as excellent insulation and

sound-blocking properties. Block may be covered with siding or stone veneer, or even clad with stucco for an easy and cost-effective finish.

The concept of a brick or stone home has changed over the years. A century ago, brick homes consisted of two rows of brick separated by a wall cavity. The cavity kept water and air out of the home and served as a space for insulation and waterproofing materials. Today, brick homes are rarely built this way and typically include an inner wall of block and an outer brick or stone veneer wall. In some cases, brick or stone veneer is simply adhered to the inner framing wall using mortar, while in others it's offset by metal brick ties or straps.

#### Concrete

Concrete homes can be constructed from cast-in-place concrete, precast panels or insulated-concrete forms that contain integral insulation. No matter which of these methods you choose, concrete homes provide long-lasting durability and strength with very little maintenance. They offer a high level of fire and pest resistance and are heavy enough to withstand high winds and tough storms. Concrete homes tend to cost more than wood or metal framing and often require experienced builders to ensure a safe structure.

#### Green Techniques

While any home can be made more energy-efficient, truly green building techniques represent a small portion of the home building market. According to the Department of Energy, straw bale homes represent a sustainable and eco-friendly design with enormous potential. Earth-mound homes, including those made from adobe and those sheltered underground, provide another energy-efficient design possibility. Structural insulated panels, or SIPs, are perhaps one of the most widely used green construction methods. They consist of sheets of foam insulation sandwiched between sheets of plywood or fiber cement. These panels form the walls, floor and ceiling of a home to create a virtually unbeatable level of energy efficiency and watertight construction.

### **Road construction**

Road construction requires the creation of an engineered continuous right-of-way or roadbed, overcoming geographic obstacles and having grades low enough to permit vehicle or foot travel, and may be required to meet standards set by law or official guidelines. The process is often begun with the removal of earth and rock by digging or blasting, construction of embankments, bridges and tunnels, and removal of vegetation (this may involve deforestation) and followed by the laying of pavement material. A variety of road building equipment is employed in road building.

After design, approval, planning, legal and environmental considerations have been addressed alignment of the road is set out by a surveyor. The radii and gradient are designed and staked out to best suit the natural ground levels and minimize the amount of cut and fill.

Roads are designed and built for primary use by vehicular and pedestrian traffic. Storm drainage and environmental considerations are a major concern. Erosion and sediment controls are constructed to prevent detrimental effects. Drainage lines are laid with sealed joints in the road easement with runoff coefficients and characteristics adequate for the land zoning and storm water system. Drainage systems must be capable of carrying the ultimate design flow from the upstream catchment with approval for the outfall from the appropriate authority to a watercourse, creek, river or the sea for drainage discharge.

A borrow pit (source for obtaining fill, gravel, and rock) and a water source should be located near or in reasonable distance to the road construction site. Approval from local authorities may be required to draw water or for working (crushing and screening) of materials for construction needs. The topsoil and vegetation is removed from the borrow pit and stockpiled for subsequent rehabilitation of the extraction area. Side slopes in the excavation area not steeper than one vertical to two horizontal for safety reasons.

Old road surfaces, fences, and buildings may need to be removed before construction can begin. Trees in the road construction area may be marked for retention. These protected trees should not have the topsoil within the area of the tree's drip line removed and the area should be kept clear of construction material and equipment. Compensation or replacement may be required if a protected tree is damaged. Much of the vegetation may be mulched and put aside for use during

reinstatement. The topsoil is usually stripped and stockpiled nearby for rehabilitation of newly constructed embankments along the road. Stumps and roots are removed and holes filled as required before the earthwork begins. Final rehabilitation after road construction is completed will include seeding, planting, watering and other activities to reinstate the area to be consistent with the untouched surrounding areas.

Processes during earthwork include excavation, removal of material to spoil, filling, compacting, construction and trimming. If rock or other unsuitable material is discovered it is removed, moisture content is managed and replaced with standard fill compacted to meet the design requirements (generally 90–95% relative compaction). Blasting is not frequently used to excavate the roadbed as the intact rock structure forms an ideal road base. When a depression must be filled to come up to the road grade the native bed is compacted after the topsoil has been removed. The fill is made by the "compacted layer method" where a layer of fill is spread then compacted to specifications, under saturated conditions. The process is repeated until the desired grade is reached.

### **Historian uses lasers to unlock mysteries of Gothic cathedrals**

Thirteen million people visit the Notre Dame Cathedral in Paris every year, entering through massive wooden doors at the base of towers as solidly planted as mountains. They stand in front of walls filigreed with stained glass and gaze at a ceiling supported by delicate ribs of stone.

If its beauty and magnificence is instantly apparent, so much about Notre Dame is not. To begin with, we don't know who built this cathedral – or how. (Discover the 800-year history of Notre Dame Cathedral.)

The bishop of Paris, Maurice de Sully, commissioned the massive church complex around 1160. Yet the names of those who first constructed this masterpiece are lost to history. They left no records – only centuries of speculation – behind.

"So much ink has been spilled over that building," says art historian Andrew Tallon. "So much of it is completely wrong."

A former composer, would-be monk, and self-described gearhead – or, as he puts it, "tacklehead" – Tallon intends to make that history right. With the help of 21st-century laser scanners, he is teasing out clues hidden in the ancient stones of Notre Dame and other medieval structures – and revolutionizing our understanding of how these spectacular buildings were made.

Tallon, who died Nov. 18, 2018, at 49, wasn't the first to realize that laser scanners could be used to deconstruct Gothic architecture. But he was the first to use the scans to get inside medieval builders' heads.

"Every building moves," he says. "It heaves itself out of shape when foundations move, when the sun heats up on one side." How the building moves reveals its original design and the choices that the master builder had to make when construction didn't go as planned. Tracking this thought process requires precise measurements. (See vintage pictures of the cathedral from Nat Geo's archive.)

For a long time, the tools used to measure medieval buildings were nearly as old as the buildings themselves: plumb bobs, string, rulers, and pencils. Using them was tedious, time-consuming, and error-prone.

"You can't hang from a vault and measure it by hand," says Michael Davis, an art historian at Mount Holyoke College who once spent nine weeks surveying two churches with these primitive tools.

Laser scans, with their exquisite precision, don't miss a thing. Mounted on a tripod, the laser beam sweeps around the choir of a cathedral, for example, and measures the distance between the scanner and every point it hits. Each measurement is represented by a colored dot, which cumulatively create a three-dimensional image of the cathedral. "If you've done your job properly," says Tallon, the scan is "accurate to within five millimeters [.5 centimeter]."

Two researchers at Columbia University – Peter Allen, a computer scientist, and Stephen Murray, an art historian – attempted one of the first laser scans of a Gothic building in 2001 at the cathedral in Beauvais, north of Paris, which Murray had once measured by hand with steel tape and wooden calipers.

## **Fun facts about the human skeleton**

People are often surprised to learn that bone is a living tissue. It is widely understood that our bones have the ability to repair themselves after breaks and fractures. But they are also constantly removing and rebuilding themselves in response to everyday activity, in a cellular process that we call remodelling.

Here are some other facts about the skeleton.

### **1. Not everyone has 206 bones**

Textbooks teach that there are 206 bones in the human skeleton as the anatomical norm. But babies are born with over 300 bones, originally made of cartilage, which are mineralised during the first few years of life, and some bones fuse together.

Some people are born with extra bones, such as a 13th pair of ribs or an extra digit. Some people even develop extra bones during their lives. A recent study showed that the fabella, a little bean-shaped bone found at the back of the knee, is becoming more prevalent in the human body because of improved nutrition and people getting heavier.

### **2. The human skeleton is constantly changing in height**

The change in height of a child in their first year is the most rapid and we have reached our adult height by our mid- to late teens. But even once our bones stop growing, our height can still change.

At joints (spaces where two bones meet), there is a layer of cartilage covering the bones. Cartilage is a rubbery layer of tissue made up of water, collagens, proteoglycans and cells. Over the course of a day, the cartilage, particularly in your spine, is compressed by gravity. This means that you are shorter by the time you go to bed. Thankfully, after a period of lying horizontally, the cartilage is able to return to its original size. The lack of gravity in space has the opposite effect on astronauts who are up to 3% taller after a stint in space.

And it's not just the cartilage – even bones themselves shorten with impact. Scientists have shown that on impact when running, the tibia (shin bone) temporarily shortens by a millimetre.

### **3. Only one bone is not connected to another bone**

The hip bone's connected to the thigh bone ... but not all bones in the human skeleton are connected to each other. The one exception is the hyoid bone.

### **4. Bone marrow isn't just space filler**

Long bones, such as the thighbone, are filled with bone marrow made of fat cells, blood cells and immune cells. In children, the bone marrow is red reflecting its role in making blood cells. In adults, the bone marrow is yellow and contains 10% of all the fat in the adult body.

### **5. The smallest bones are in the ear**

The smallest bones in the human body are the malleus (hammer), incus (anvil) and the stapes (stirrup). Collectively, these bones are known as the ossicles (Latin for "tiny bones") and their role is to transmit sound vibrations from the air to the fluid in the inner ear.

### **6. Bones cause you stress**

Within the human body, our sympathetic nervous system is the mechanism by which our body readies itself for intense activity. This is often called the fight-or-flight response and is associated with the release of the hormone adrenaline in response to a stressful situation. But recently, researchers published a paper identifying osteocalcin, a hormone released by bone-forming cells, as a key player in the stress response.

Given we have long known that the physical function of the skeleton is to protect the body – for example, the ribs protect our most important organs – maybe it shouldn't come as a surprise that our bones also have a physiological role in keeping us safe.