

1. Bài tập 1

FREYA STARK, EXPLORER AND WRITER

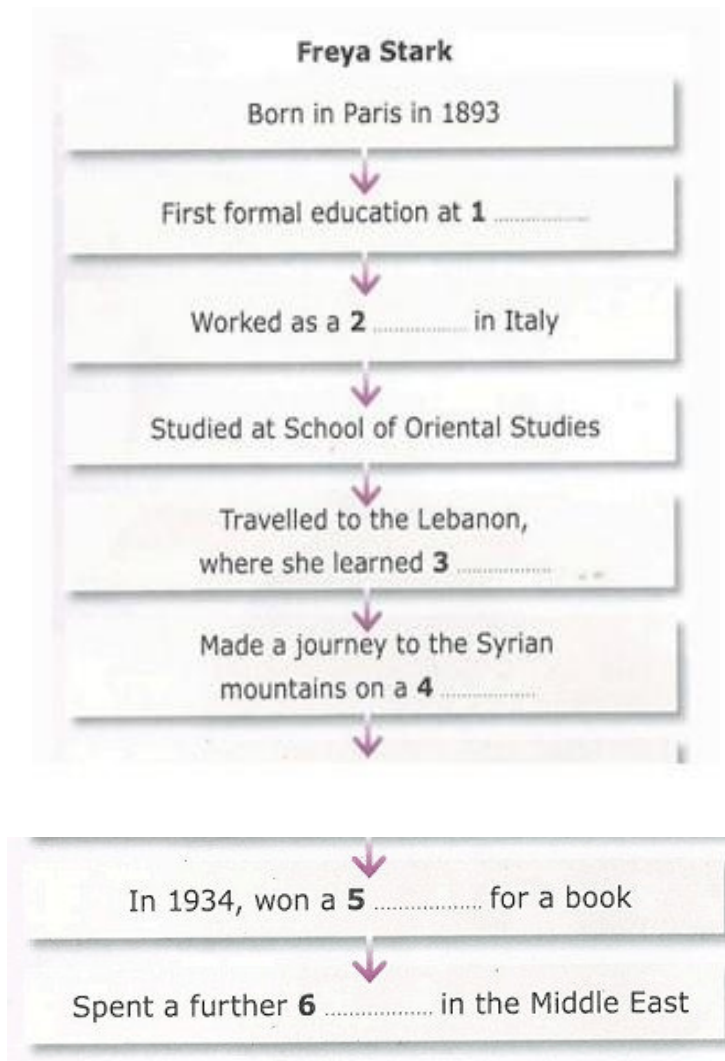
Freya Stark traveled to many areas of the Middle East, often alone.

Freya Stark was an explorer who lived during a time when explorers were regarded as heroes. She traveled to distant areas of the Middle East, where few Europeans - especially women - had traveled before. She also traveled extensively in Turkey, Greece, Italy, Nepal and Afghanistan.

Stark was born in Paris in 1893. Although she had no formal education as a child, she moved about with her artist parents and learned French, German and Italian. She entered London University in 1912, but at the start of World War I, she joined the nurse corps and was sent to Italy. After the war, she returned to London and attended the School of Oriental Studies. Her studies there led to extensive travel in the Middle East, enabling her to eventually become fluent in Persian, Russian and Turkish.

Stark became well known as a traveler and explorer in the Middle East. She traveled to the Lebanon in 1927 at the age of 33 when she had saved enough money, and while there, she studied Arabic. In 1928, she traveled by donkey to the Jebel Druze, a mountainous area in Syria. During another trip, she went to a distant region of the Elburz, a mountain range in Iran, where she made a map. She was searching for information about an ancient Muslim sect known as the Assassins, which she wrote about in *Valley of the Assassins* (1934), a classic for which she was awarded a Gold Medal by Royal Geographic Society. For the next 12 years, she continued her career as a traveler and writer, establishing a style which combined an account of her journey with personal commentary on the people, places, customs, history and politics of the Middle East.

Read the passage and complete the flow chart. Choose NO MORE THAN 2 WORDS AND/OR A NUMBER from the passage for each answer.



2. Bài tập 2

APPLYING TO STELLINGA COLLEGE

Why Stellinga?

Thank you for your interest in Stellinga International College. As an international student, we are sure you will find our college an exciting place to study, with like-minded and ambitious individuals.

Preparing and submitting your application

We have tried to make the application process as easy as possible for you, but there are a number of procedures you must follow.

All our courses are taught in English, so first of all you will probably need to submit evidence of your English language ability. We require an IELTS score of 6.5 or another test result which is equivalent (see appendix). You will also have to send us your secondary school diploma, so that we can evaluate it. If you have the International Baccalaureate or a Dutch VWO diploma, you don't need to provide English language test results.

We will also require a personal statement. This is a text of up to 1,000 words in which you introduce yourself, explain your interest in our college, and why you want to study your chosen course. If you are from outside the European Union (EU), it is important that you have an entrance visa before you come to study in the Netherlands, but we will apply for this for you.

We now only accept online applications, so please ensure that you have all your documents ready to upload before you begin. Any documents that are not in English originally will also need to be translated and the translation also uploaded.

You will need a passport photograph; a copy of your passport; copies of all your certificates and diplomas, etc; your proof of language ability (see above); and your personal statement in English.

What happens next?

Add a paragraph here. Your application will then be considered.

If your initial application is successful, you will be invited for an interview. This will be conducted in English via Skype, over the phone or on site. You will talk to two or three members of staff for up to 30 minutes, and will be asked to elaborate on your application documents and your personal statement. We aim to inform you of our decision in writing, within 4 weeks. There are several possible outcomes: you may not have been successful; you may be offered a place at the college or you may be offered a place on the waiting list. You will need to reply to any offers within two weeks, otherwise your place may be offered to somebody else.

Good luck with your application.

Questions 1-11



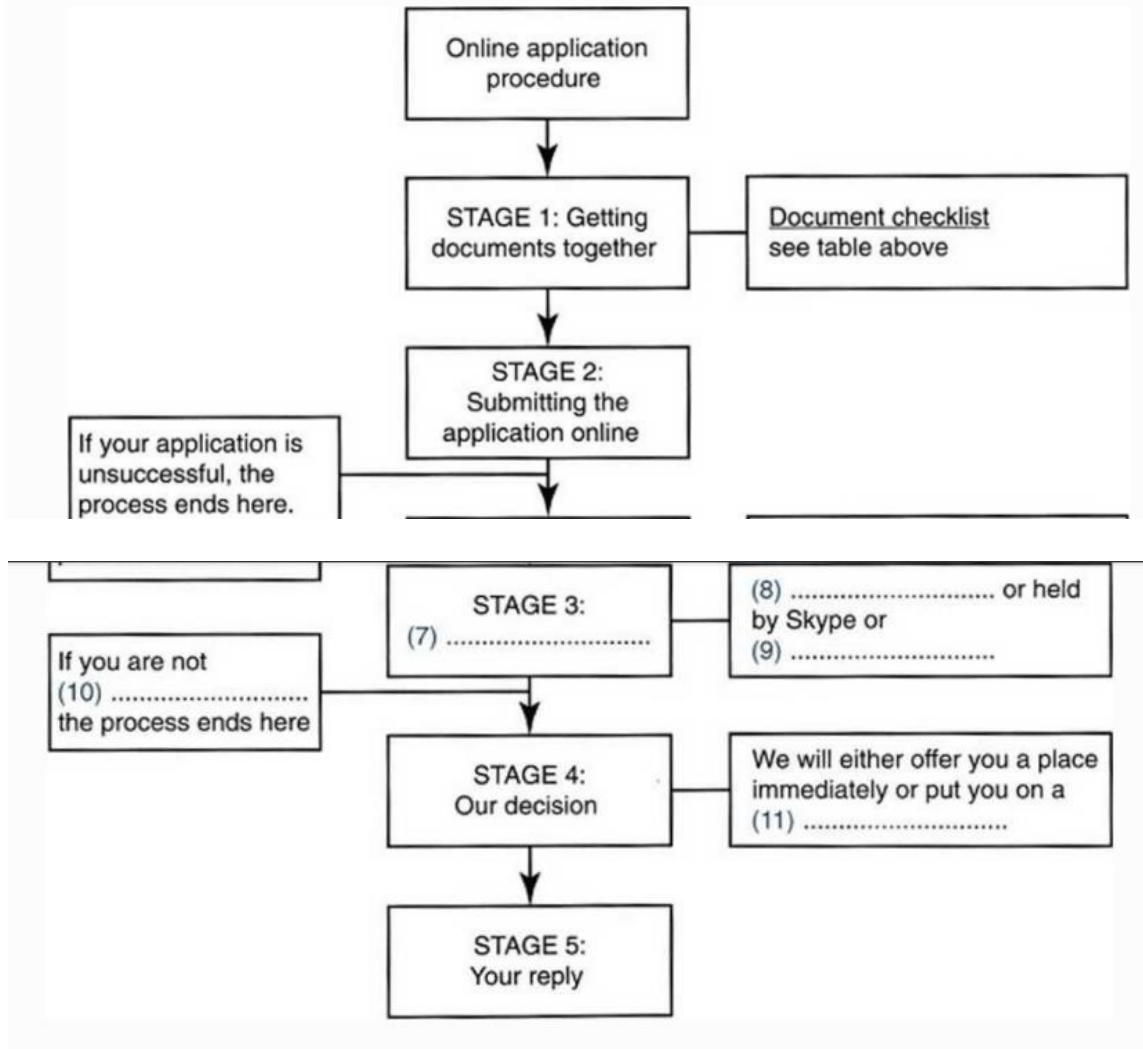
Using **NO MORE THAN TWO WORDS** from the passage for each answer, complete the table and the flow chart below.

The required documents:

Evidence of language ability	IELTS 6.5 or (1)
Evidence of studies	(2) Dutch VWO diploma, or other secondary school diploma
Information about motivation	(3) with a maximum length of (4)
Proof of identity	(5) and passport photo
Other	(6) if originals are in a foreign language



The online application process for people outside the EU:



3. Bài tập 3

THE WAY THE BRAIN BUYS

Supermarkets take great care over the way the goods they sell are arranged. This is because they know a lot about how to persuade people to buy things.

When you enter a supermarket, it takes some time for the mind to get into a shopping mode. This is why the area immediately inside the entrance of a supermarket is known as the 'decompression zone'. People need to slow down and take stock of the surroundings, even if they are regulars. Supermarkets do not expect to sell much here, so it tends to be used more for promotion. So the large items piled up here are designed to suggest that there are bargains further inside the store, and shoppers are not necessarily expected to buy them. Walmart, the world's biggest retailer, famously employs 'greeters' at the entrance to its stores. A friendly welcome is said to cut shoplifting. It is harder to steal from nice people.

Immediately to the left in many supermarkets is a 'chill zone', where customers can enjoy browsing magazines, books and DVDs. This is intended to tempt unplanned purchases and slow customers down. But people who just want to do their shopping quickly will keep walking ahead, and the first thing they come to is the fresh fruit and vegetables section. However, for shoppers, this makes no sense. Fruit and vegetables can be easily damaged, so they should be bought at the end, not the beginning, of a shopping trip. But psychology is at work here: selecting these items makes people feel good, so they feel less guilty about reaching for less healthy food later on.

Shoppers already know that everyday items, like milk, are invariably placed towards the back of a store to provide more opportunity to tempt customers to

buy things which are not on their shopping list. This is why pharmacies are also generally at the back. But supermarkets know shoppers know this, so they use other tricks, like placing popular items halfway along a section so that people have to walk all along the aisle looking for them. The idea is to boost 'dwell time': the length of time people spend in a store.

Having walked to the end of the fruit-and-vegetable aisle, shoppers arrive at counters of prepared food, the fishmonger, the butcher and the deli. Then there is the in-store bakery, which can be smelt before it is seen. Even small supermarkets now use in store bakeries. Mostly these bake pre-prepared items and frozen ingredients which have been delivered to the supermarket previously, and their numbers have increased, even though central bakeries that deliver to a number of stores are much more efficient. They do it for the smell of freshly baked bread, which arouses people's appetites and thus encourages them to purchase not just bread but also other food, including ready meals.

Retailers and producers talk a lot about the 'moment of truth'. This is not a philosophical idea, but the point when people standing in the aisle decide to buy something and reach to get it. At the instant coffee section, for example, branded products from the big producers are arranged at eye level while cheaper ones are lower down, along with the supermarket's own label products. But shelf positioning is fiercely fought over, not just by those trying to sell goods, but also by those arguing over how best to manipulate shoppers. While many stores reckon eye level is the top spot, some think a little higher is better. Others think goods displayed at the end of aisles sell the most because they have the greatest visibility. To be on the right-hand side of an eye-level selection is often considered the very best place, because most people are right-handed and

most people's eyes drift rightwards. Some supermarkets reserve that for their most expensive own-label goods.

Scott Bearse, a retail expert with Deloitte Consulting in Boston, Massachusetts, has led projects observing and questioning tens of thousands of customers about how they feel about shopping. People say they leave shops empty-handed more often because they are 'unable to decide' than because prices are too high, says Mr Bearse. Getting customers to try something is one of the best ways of getting them to buy, adds Mr Bearse. Deloitte found that customers who use fitting rooms in order to try on clothes buy the product they are considering at a rate of 85% compared with 58% for those that do not do so. Often a customer struggling to decide which of two items is best ends up not buying either. In order to avoid a situation where a customer decides not to buy either product, a third 'decoy' item, which is not quite as good as the other two, is placed beside them to make the choice easier and more pleasurable. Happier customers are more likely to buy.

Complete the flow chart below. Choose **NO MORE THAN TWO WORDS** from the passage for each answer.

In-store bread production process

The supermarket is sent 11 and other items which have been prepared earlier.



Baking bread in-store produces an aroma.



Shoppers' 12 are stimulated.



They are then keener to buy food, including bread and 13



4. Bài tập 4

HISTORY OF THE POSTER

The appearance of the poster has changed continuously over the past two centuries.

The first posters were known as 'broadsides' and were used for public and commercial announcements. Printed on one side only using metal type, they were quickly and crudely produced in large quantities. As they were meant to be read at a distance, they required large lettering.

There were a number of negative aspects of large metal type. It was expensive, required a large amount of storage space and was extremely heavy. If a printer did have a collection of large metal type, it was likely that there were not enough letters. So printers did their best by mixing and matching styles. Commercial pressure for large type was answered with the invention of a system for wood type production. In 1827, Darius Wells invented a special wood drill - the lateral router - capable of cutting letters on wood blocks. The router was used in combination with William Leavenworth's pantograph (1834) to create decorative wooden letters of all shapes and sizes. The first posters began to appear, but they had little colour and design; often wooden type was mixed with metal type in a conglomeration of styles.

A major development in poster design was the application of lithography, invented by Alois Senefelder in 1796, which allowed artists to hand-draw letters, opening the field of type design to endless styles. The method involved drawing with a greasy crayon onto finely surfaced Bavarian limestone and offsetting that image onto paper. This direct process captured the artist's true intention; however, the final printed image was in reverse. The images and lettering

needed to be drawn backwards, often reflected in a mirror or traced on transfer paper.

As a result of this technical difficulty, the invention of the lithographic process had little impact on posters until the 1860s, when Jules Cheret came up with his 'three-stone lithographic process'. This gave artists the opportunity to experiment with a wide spectrum of colours. Although the process was difficult, the result was remarkable, with nuances of colour impossible in other media even to this day. The ability to mix words and images in such an attractive and economical format finally made the lithographic poster a powerful innovation. Starting in the 1870s, posters became the main vehicle for advertising prior to the magazine era and the dominant means of mass communication in the rapidly growing cities of Europe and America. Yet in the streets of Paris, Milan and Berlin, these artistic prints were so popular that they were stolen off walls almost as soon as they were hung. Cheret, later known as 'the father of the modern poster', organised the first exhibition of posters in 1884 and two years later published the first book on poster art. He quickly took advantage of the public interest by arranging for artists to create posters, at a reduced size, that were suitable for in-home display.

Thanks to Cheret, the poster slowly took hold in other countries in the 1890s and came to celebrate each society's unique cultural institutions: the cafe in France, the opera and fashion in Italy, festivals in Spain, literature in Holland and trade fairs in Germany. The first poster shows were held in Great Britain and Italy in 1894, Germany in 1896 and Russia in 1897. The most important poster show ever, to many observers, was held in Reims, France, in 1896 and featured an unbelievable 1,690 posters arranged by country. In the early 20th century, the poster continued to play a large communication role and to go through a range of styles. By the 1950s, however, it had begun

to share the spotlight with other media, mainly radio and print. By this time, most posters were printed using the mass production technique of photo offset, which resulted in the familiar dot pattern seen in newspapers and magazines. In addition, the use of photography in posters, begun in Russia in the twenties, started to become as common as illustration.

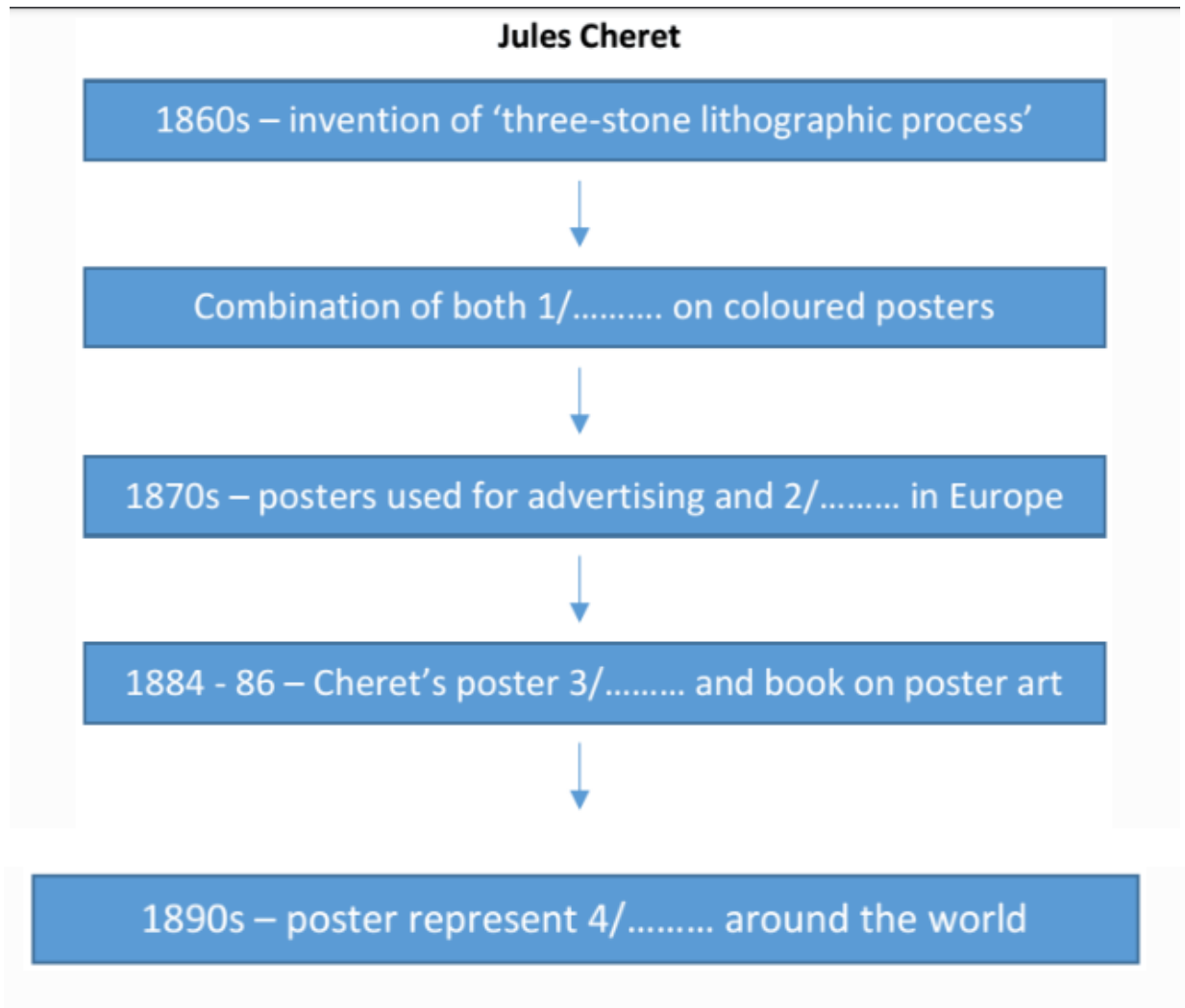
In the late fifties, a new graphic style that had strong reliance on typographic elements in black and white appeared. The new style came to be known as the International Typographic Style. It made use of a mathematical grid, strict graphic rules and black-and-white photography to provide a clear and logical structure. It became the predominant style in the world in the 1970s and continues to exert its influence today.

It was perfectly suited to the increasingly international post-war marketplace, where there was a strong demand for clarity. This meant that the accessibility of words and symbols had to be taken into account. Corporations wanted international identification, and events such as the Olympics called for universal solutions, which the Typographic Style could provide.

However, the International Typographic Style began to lose its energy in the late 1970s. Many criticised it for being cold, formal and dogmatic. A young teacher in Basel, Wolfgang Weingart, experimented with the offset printing process to produce posters that appeared complex and chaotic, playful and spontaneous - all in stark contrast to what had gone before. Weingart's liberation of typography was an important foundation for several new styles. These ranged from Memphis and Retro to the advances now being made in computer graphics.

Adapted from www.internationalposter.com

Complete the flow chart below. Write **NO MORE THAN THREE WORDS** from the passage for each answer.



5. Bài tập 5

THE BEACH, A NATURAL TREASURE TROVE

Nature walks can be fun, energizing and educational at the same time. In Part One, we will look at what we can find on a marine walk. In Part Two, we will discuss our fascinating forests.

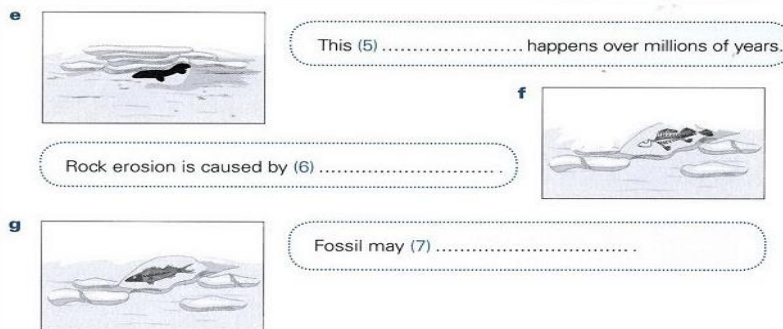
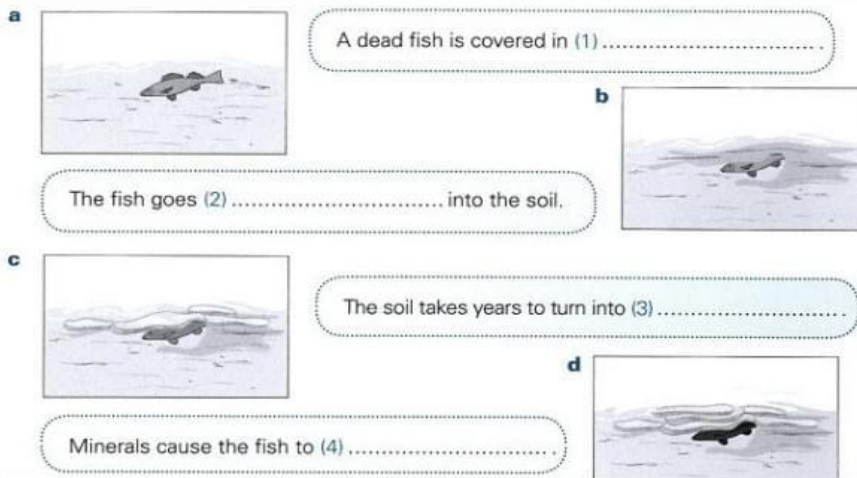
First of all, when you are walking on the beach you may be able to spot tracks. Birds and crabs leave footprints behind, especially in wet sand. On sandy beaches you will also be able to find interesting holes, made by crabs that were digging for food in the mud.

You may also come across jellyfish, as these are often washed up on the beach by the tides. They have no eyes, ears, heart or head and are mostly made of water. They look like a bag with arms, which are called tentacles. These contain poison, which helps them catch food. Even when they are out of the water or in pieces the tentacles may sting you, so they are best left alone. Other animals you may find are coral and barnacles. The latter are marine animals that are related to crabs and lobsters and live in shallow waters. They like to attach themselves to hard materials, so you are likely to find them stuck to a piece of wood.

You may also see what look like small gelatinous blobs but are actually fish or worm eggs. If you are lucky, you may find a fossil. In essence, this is an animal that died and got buried in a sea bed. They are likely to look like a piece of rock with an imprint of an animal skeleton. Their history is very interesting. For an animal to become fossilized, it has to be buried in mud, sand or soil. If an animal dies but is not buried, it is more likely to rot away, be swept away by wind or water, and/or be eaten by another animal. Over millions of years, the

animal remains become buried deeper and deeper; the mud, sand or soil compresses and slowly becomes rock. Their bone or shell starts to crystallize, because of surrounding minerals and chemicals. Ideally, the temperature stays relatively constant throughout this process. Sometimes the fossil dissolves completely and just leaves an imprint. At other times, waves, tides and currents slowly make the rocks erode, which allows the animal remains to break off, ready for you to find. What you will definitely find a beach are shells. These were once the homes of animals such as snails, barnacles and mussels, consisting of a hard layer that the animal created for protection as part of its body. After the animal has died, its soft parts have rotted or have been eaten by other animals, such as crabs. What is left is a beautiful seashell for you to admire and take home if you wish.

Using **NO MORE THAN FOUR WORDS** from the passage, complete each gap in the diagram.



6. Bài tập 6

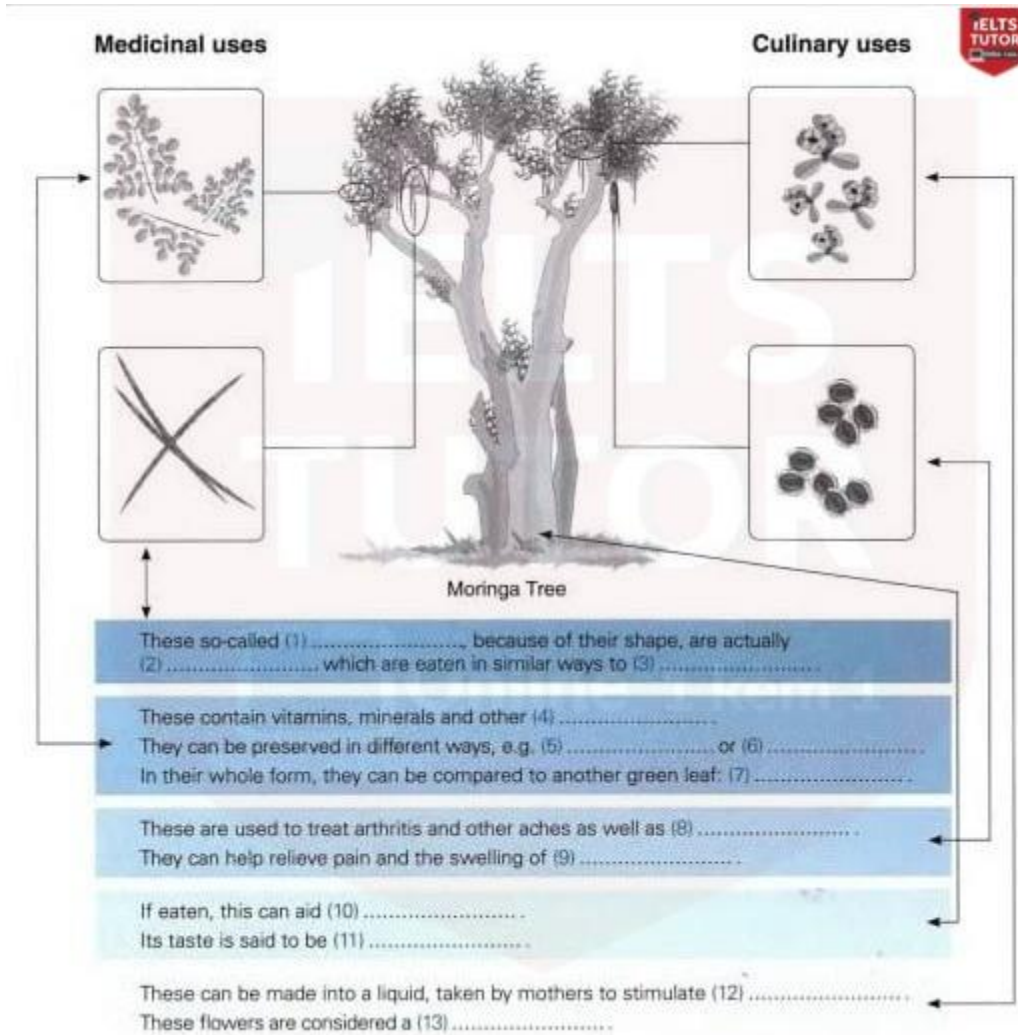
THE MANY USES OF THE MORINGA TREE

The Moringa tree, Saragwa, or Drumstick tree, is relatively unknown in the West, despite the fact that it is incredibly useful. Miriam Tayne reports about its culinary, medicinal and other uses.

The Moringa tree is a relatively small tree that typically grows to between three and ten metres tall. Its flowers are creamy-coloured and have been compared to small orchids. The plant has long and round green pods that can grow to 30cms and which look a bit like drumsticks, hence the tree's common name. The pods consist of three parts, which contain round, dark brown seeds. Planting needs to be done in sandy or muddy soil, using these seeds or tree cuttings. The plant does not tolerate frost but thrives in hot climates. It is very common in South and South-east Asia, Africa and America. The leaves are reputed to have anti-inflammatory and anti-bacterial properties, so are used for eye and ear infections, fevers, etc. They are also held against the forehead to reduce headaches, or made into tea to treat stomach complaints. As they contain a lot of iron they have been used for the treatment of anaemia, a medical condition in which there are too few red cells in the blood, causing tiredness. The plant also contains many other nutrients, such as phosphorus, calcium, potassium, and vitamins A and C. The ground-up seeds are commonly used to treat certain skin infections, but can be used for much more. Ground seeds can be mixed with salt or oils to apply to the body to treat cramp, back ache and forms of arthritis, a medical condition in which the joints are swollen and painful. The oil, called Ben oil because it contains behenic acid, is also used as a hair treatment or a perfume,

and to deter mosquitoes and treat their bites. The by-products of the oil manufacturing process are used for fertilization and water purification. The roots work in exactly the same way as the seeds, but are much stronger, so are not used as often. They have additional uses for heart and circulation problems, whereas the gum is sometimes used to treat asthma. The bark has quite a pleasant taste and is sometimes eaten to encourage digestion. The plant's main use is as food: for livestock, and for human beings, because it contains high concentrations of fibre and protein. The drumsticks are eaten in soup and/or as green beans, often in combination with shrimp (see picture), whereas the seeds are eaten like peas, or roasted. The leaves are eaten fresh or cooked in similar ways to spinach. Chopped, they are used as a garnish on soups and salads. They are often pickled or dried so that they are always available to use in sauces, stir-fries, soups and in sweet and sour or spicy curries.

Like every other part of the tree, its flowers are not just decorative but also functional. They taste a bit like wild mushrooms and are considered a delicacy. They are used to make tea to treat the common cold, mixed with honey to make cough medicine, and made into juice to be drunk during breastfeeding as it is said to increase milk flow. There is not a part of the tree that is not used. The Moringa tree is probably the most beneficial tree in the world.



7. Bài tập 7

A CHRONICLE OF TIMEKEEPING

Our conception of time depends on the way we measure it.

According to archaeological evidence, at least 5,000 years ago, and long before the advent of the Roman Empire, the Babylonians began to measure time, introducing calendars to co-ordinate communal activities, to plan the shipment of goods and, in particular, to regulate planting and harvesting. They based their calendars on three natural cycles: the solar day, marked by the successive periods of light and darkness as the earth rotates on its axis; the lunar month, following the phases of the moon as it orbits the earth; and the solar year, defined by the changing seasons that accompany our planet's revolution around the sun.

Before the invention of artificial light, the moon had greater social impact. And, for those living near the equator in particular, its waxing and waning was more conspicuous than the passing of the seasons. Hence, the calendars that were developed at the lower latitudes were influenced more by the lunar cycle than by the solar year. In more northern climes, however, where seasonal agriculture was practised, the solar year became more crucial. As the Roman Empire expanded northward, it organised its activity chart for the most part around the solar year.

Centuries before the Roman Empire, the Egyptians had formulated a municipal calendar having 12 months of 30 days, with five days added to approximate the solar year. Each period of ten days was marked by the appearance of special groups of stars called decans. At the rise of the star Sirius just before sunrise, which occurred around the all-important annual flooding of the Nile, 12 decans

could be seen spanning the heavens. The cosmic significance the Egyptians placed in the 12 decans led them to develop a system in which each interval of darkness (and later, each interval of daylight) was divided into a dozen equal parts. These periods became known as temporal hours because their duration varied according to the changing length of days and nights with the passing of the seasons. Summer hours were long, winter ones short; only at the spring and autumn equinoxes were the hours of daylight and darkness equal. Temporal hours, which were first adopted by the Greeks and then the Romans, who disseminated them through Europe, remained in use for more than 2,500 years.

In order to track temporal hours during the day, inventors created sundials, which indicate time by the length or direction of the sun's shadow. The sundial's counterpart, the water clock, was designed to measure temporal hours at night. One of the first water clocks was a basin with a small hole near the bottom through which the water dripped out. The falling water level denoted the passing hour as it dipped below hour lines inscribed on the inner surface. Although these devices performed satisfactorily around the Mediterranean, they could not always be depended on in the cloudy and often freezing weather of northern Europe.

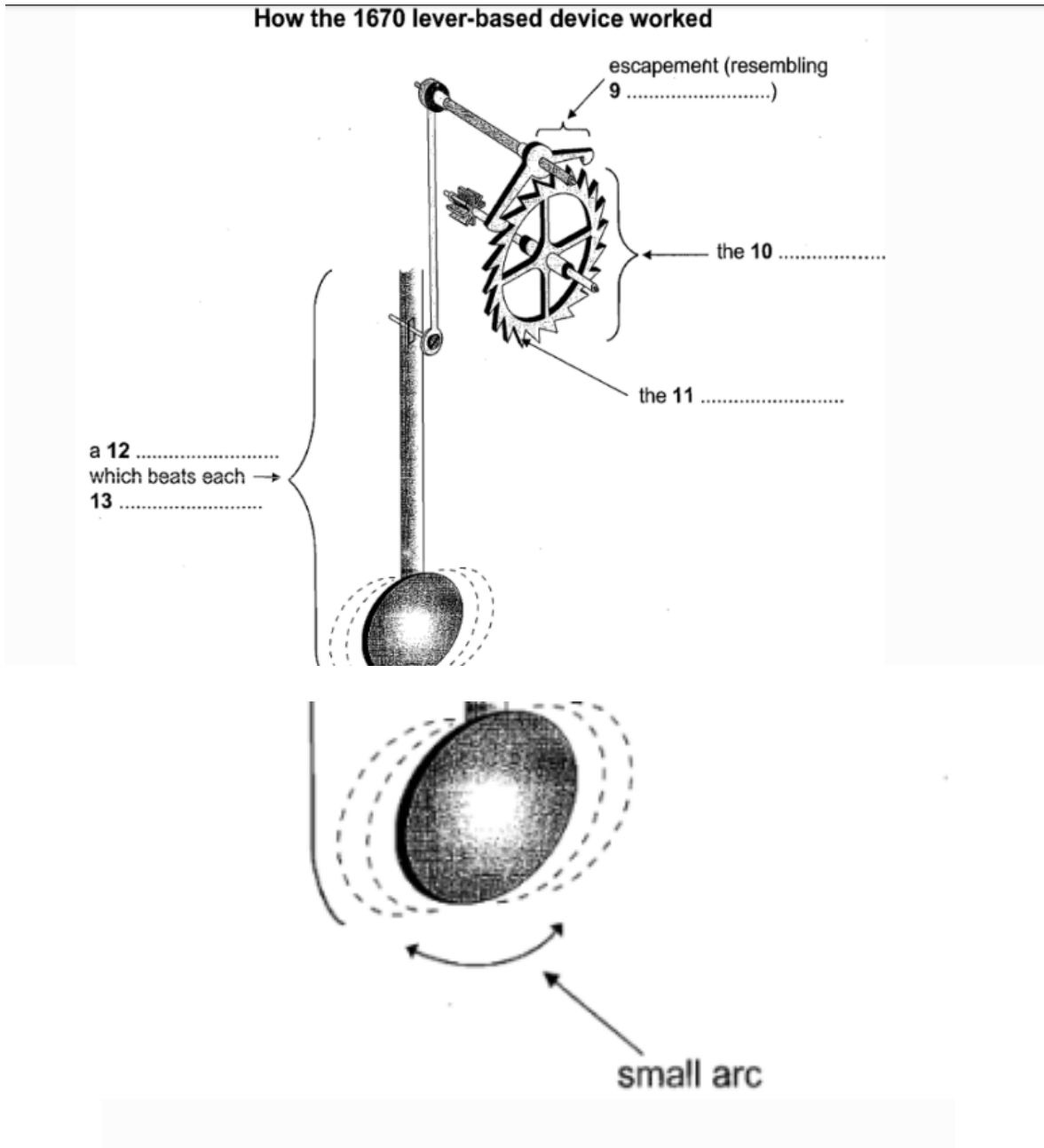
The advent of the mechanical clock meant that although it could be adjusted to maintain temporal hours, it was naturally suited to keeping equal ones. With these, however, arose the question of when to begin counting, and so, in the early 14th century, a number of systems evolved. The schemes that divided the day into 24 equal parts varied according to the start of the count: Italian hours began at sunset, Babylonian hours at sunrise, astronomical hours at midday and 'great clock' hours, used for some large public clocks in Germany, at midnight. Eventually these were superseded by 'small clock', or French, hours, which split the day into two 12-hour periods commencing at midnight.

The earliest recorded weight-driven mechanical clock was built in 1283 in Bedfordshire in England. The revolutionary aspect of this new timekeeper was neither the descending weight that provided its motive force nor the gear wheels (which had been around for at least 1,300 years) that transferred the power; It was the part called the escapement. In the early 1400s came the invention of the coiled spring or fusee which maintained constant force to the gear wheels of the timekeeper despite the changing tension of its mainspring. By the 16th century, a pendulum clock had been devised, but the pendulum swung in a large arc and thus was not very efficient.

To address this, a variation on the original escapement was invented in 1670, in England. It was called the anchor escapement, which was a lever-based device shaped like a ship's anchor. The motion of a pendulum rocks this device so that it catches and then releases each tooth of the escape wheel, in turn allowing it to turn a precise amount. Unlike the original form used in early pendulum clocks, the anchor escapement permitted the pendulum to travel in a very small arc. Moreover, this invention allowed the use of a long pendulum which could beat once a second and thus led to the development of a new floor-standing case design, which became known as the grandfather clock.

Today, highly accurate timekeeping instruments set the beat for most electronic devices. Nearly all computers contain a quartz-crystal clock to regulate their operation. Moreover, not only do time signals beamed down from Global Positioning System satellites calibrate the functions of precision navigation equipment, they do so as well for mobile phones, instant stock-trading systems and nationwide power-distribution grids. So integral have these time-based technologies become to day-to-day existence that our dependency on them is recognised only when they fail to work.

Label the diagram below. Choose **NO MORE THAN TWO WORDS** from the passage for each answer. Write your answers in boxes 9-13 on your answer sheet.



8. Bài tập 8

ROBOTS AT WORK

A. The newspaper production process has come a long way from the old days when the paper was written, edited, typeset and ultimately printed in one building with the journalists working on the upper floors and the printing presses going on the ground floor. These days the editor, subeditors and journalists who put the paper together are likely to find themselves in a totally different building or maybe even in a different city. This is the situation which now prevails in Sydney. The daily paper is compiled at the editorial headquarters, known as the prepress center, in the heart of the city, but printed far away in the suburbs at the printing center. Here human beings are in the minority as much of the work is done by automated machines controlled by computers.

B. Once the finished newspaper has been created for the next morning's edition, all the pages are transmitted electronically from the prepress center to the printing center. The system of transmission is an update on the sophisticated page facsimile system already in use in many other newspapers. An imagesetter at the printing center delivers the pages as films. Each page takes less than a minute to produce, although for color pages four versions, once each for black, cyan, magenta and yellow are sent. The pages are then processed into photographic negatives and the film is used to produce aluminum printing plates ready for the presses.

C. A procession of automated vehicles is busy at the new printing centre where the Sydney Morning Herald is printed each day. With lights flashing and warning horns honking, the robots (to give them their correct name, the LGVs or laser guided vehicles) look for all the world like enthusiastic machines from a science

fiction movie, as they follow their own random paths around the plant busily getting on with their jobs. Automation of this kind is now standard in all modern newspaper plants. The robots can detect unauthorised personnel and alert security staff immediately if they find an “intruder”; not surprisingly, tall tales are already being told about the machines starting to take on personalities of their own.

D. The robots’ principal job, however, is to shift the newsprint (the printing paper) that arrives at the plant in huge reels and emerges at the other end sometime later as newspapers. Once the size of the day’s paper and the publishing order are determined at head office, the information is punched into the computer and the LGVs are programmed to go about their work. The LGVs collect the appropriate size paper reels and take them where they have to go. When the press needs another reel its computer alerts the LGV system. The Sydney LGVs move busily around the press room fulfilling their two key functions to collect reels of newsprint either from the reel stripping stations or from the racked supplies in the newsprint storage area. At the stripping station, the tough wrapping that helps to protect a reel of paper from rough handling is removed. Any damaged paper is peeled off and the reel is then weighed.

E. Then one of the four paster-robots moves in. Specifically designed for the job, it trims the paper neatly and prepares the reel for the press. If required the reel can be loaded directly onto the press; if not needed immediately, an LGV takes it to the storage area. When the press computer calls for a reel, an LGV takes it to the reel loading area of the presses. It lifts the reel into the loading position and places it in the correct spot with complete accuracy. As each reel is used up, the press drops the heavy cardboard core into a waste bin. When the bin is full, another LGV collects it and deposits the cores into a shredder for recycling.

F. The LGVs move at walking speed. Should anyone step in front of one or get too close, sensors stop the vehicle until the path is clear. The company has chosen a laser guide function system for the vehicles because, as the project development manager says “The beauty of it is that if you want to change the routes, you can work out a new route on your computer and lay it down for them to follow”. When an LGV’s batteries run low, it will take itself offline and go to the nearest battery maintenance point for replacement batteries. And all this is achieved with absolute minimum human input and a much reduced risk of injury to people working in the printing centres.

G. The question newspaper workers must now ask, however, is, “how long will it be before the robots are writing the newspapers as well as running the printing centre, churning out the latest edition every morning?”

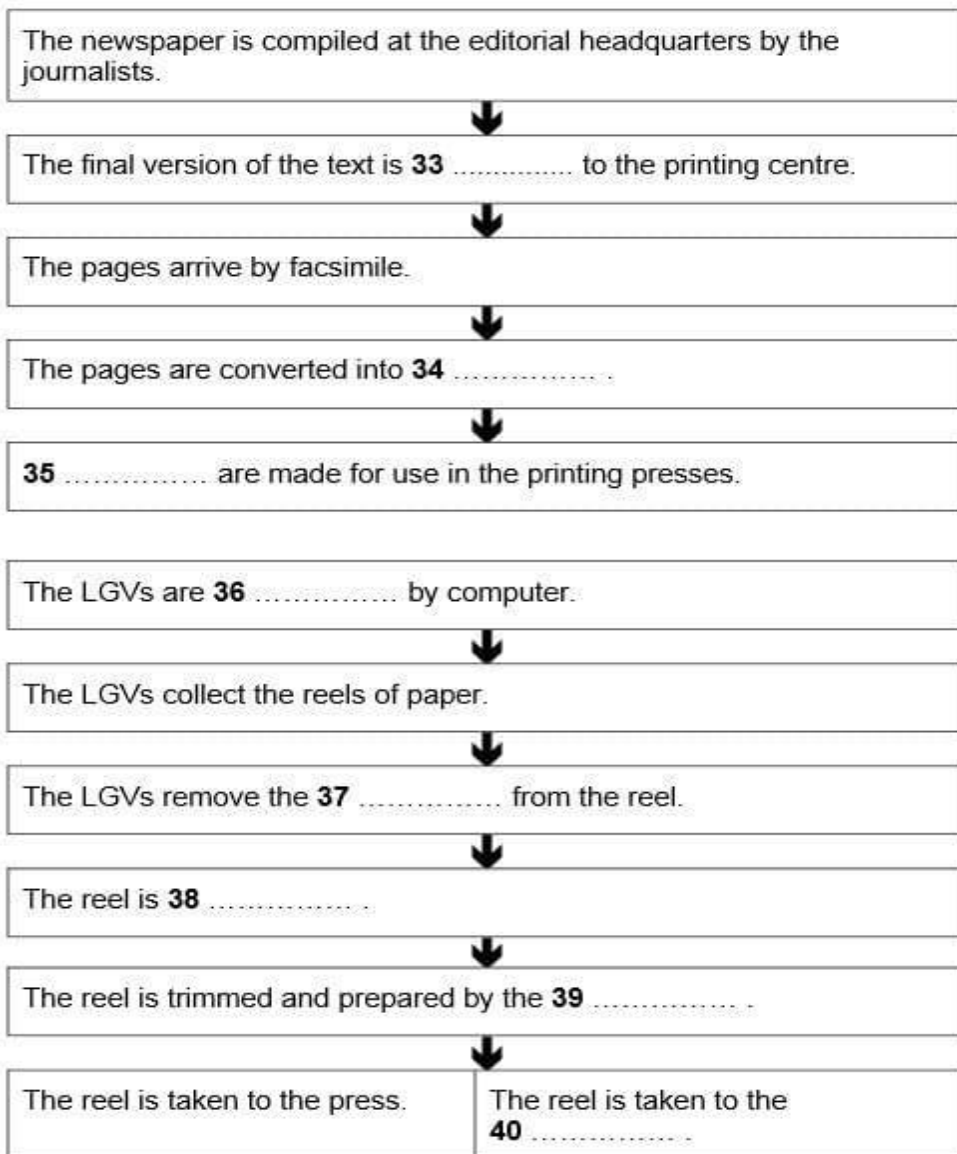
Questions 33 - 40

Using the information in the passage, complete the flow-chart below.

Write your answers in boxes **33-40** on your answer sheet.

Choose **NO MORE THAN THREE WORDS** from the passage for each answer.

The Production Process



Bài tập 9

Introducing dung beetles into a pasture is a simple process: approximately 1,500 beetles are released; a handful at a time, into fresh cow pats in the cow pasture. The beetles immediately disappear beneath the pats digging and tunnelling and, if they successfully adapt to their new environment, soon become a permanent, self-sustaining part of the local ecology. In time they multiply and within three or four years the benefits to the pasture are obvious.

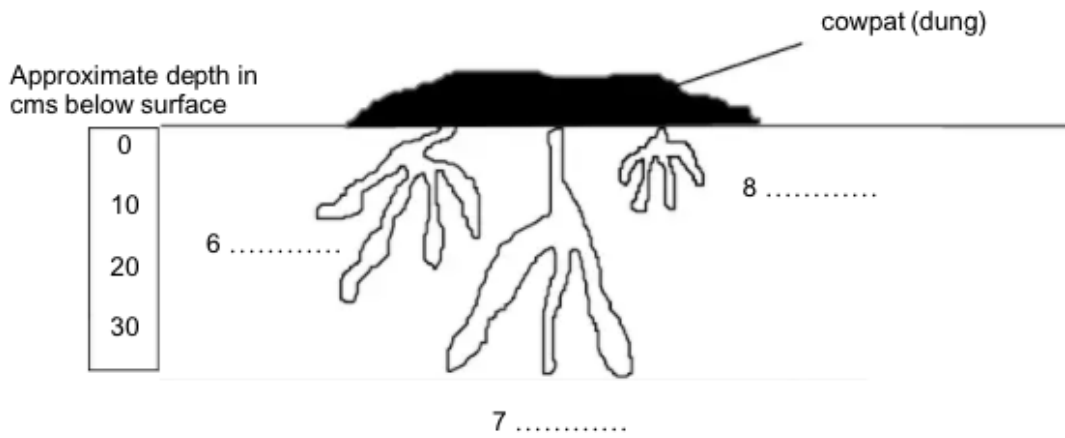
Dung beetles work from the inside of the pat so they are sheltered from predators such as birds and foxes. Most species burrow into the soil and bury dung in tunnels directly underneath the pats, which are hollowed out from within. Some large species originating from France excavate tunnels to a depth of approximately 30 cm below the dung pat. These beetles make sausage-shaped brood chambers along the tunnels. The shallowest tunnels belong to a much smaller Spanish species that buries dung in chambers that hang like fruit from the branches of a pear tree. South African beetles dig narrow tunnels of approximately 20 cm below the surface of the pat. Some surface-dwelling beetles, including a South African species, cut perfectly-shaped balls from the pat, which are rolled away and attached to the bases of plants.

For maximum dung burial in spring, summer and autumn, farmers require a variety of species with overlapping periods of activity. In the cooler environments of the state of Victoria, the large French species (2.5 cms long) is matched with smaller (half this size), temperate-climate Spanish species. The former are slow to recover from the winter cold and produce only one or two generations of offspring from late spring until autumn. The latter, which multiplies rapidly in early spring, produce two to five generations annually. The South African ball-rolling species, being a subtropical beetle, prefers the climate of northern and coastal New South Wales where it commonly works with the South African tunnelling species. In warmer climates, many species are active for longer periods of the year.

Questions 6 – 8

Label the tunnels on the diagram below using words from the box.

Write your answers in boxes 6-8 on your answer sheet.



Dung Beetle Types	
French	Spanish
Mediterranean	South African
Australian native	South African ball roller