UNIVERZITA J. E. PURKYNĚ V ÚSTÍ NAD LABEM

HANDOUT FOR LEARNERS OF SCIENCE

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INVESTICE DO ROZVOJE VZDĚLÁVÁNÍ

Handout

for Learners of Science

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Handout

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1A FRANCE

LEAD IN

France, officially the French Republic, is a country located in Western Europe, with several overseas islands and territories located on other continents. Metropolitan France extends from the Mediterranean Sea to the English Channel and the North Sea, and from the Rhine to the Atlantic Ocean. It is often referred to as *L´Hexagone* ("The Hexagon") because of the geometric shape of its territory. France is a unitary semi-presidential republic with its main ideals expressed in the Declaration of the Rights of Man and of the Citizen.

TEXT

Metropolitan France is bordered (clockwise from the north) by Belgium, Luxembourg, Germany, Switzerland, Italy, Monaco, Andorra, and Spain. France´s overseas departments and collectivities also share land borders with Brazil and Suriname (bordering French Guiana), and the Netherlands Antilles (bordering Saint-Martin). France is linked to the United Kingdom by the Channel Tunnel, which passes underneath the English Channel.

France is the largest country in the European Union by area and the second largest in Europe behind Ukraine (first if one includes its extra-European territories like French Guiana.) France has been a major power for many centuries with strong economic, cultural, military and political influence. During the 17th and 18th centuries, France colonised large sections of North America; during the 19th and early 20th centuries, France built the second largest empire of the time, including large portions of North, West and Central Africa, Southeast Asia, and many Pacific islands.

France is a developed country and possesses the fifth largest economy by nominal GDP and eighth largest economy by purchasing power parity. It is the most frequently visited country in the world, receiving 82 million foreign tourists annually. France is one of the founding members of the European Union, and has the largest land area of all members. It is also a founding member of the United Nations, and a member of the Francophonie, the G8, G20, NATO, OECD, WTO and the Latin Union. It is one of the five permanent members of the United Nations Security Council, possesses the third largest number of nuclear weapons in the world and the largest number of nuclear power plants in the European Union.

Geography

While Metropolitan France is located in Western Europe, France also has a number of territories in North America, the Caribbean, South America, the southern Indian Ocean, the Pacific Ocean, and Antarctica. These territories have varying forms of government ranging from overseas department to overseas collectivity.

Metropolitan France covers 547,030 square kilometres, having the largest area among European Union members and slightly larger than Spain. France possesses a wide variety of landscapes, from coastal plains in the north and west to mountain ranges of the Alps in the south-east, the Massif Central in the south-central and Pyrenees in the south-west. At 4,807 metres above sea-level, the highest point in Western Europe, Mont Blanc, is situated in the Alps on the border between France and Italy. Metropolitan France also has extensive river systems such as the Loire, the Garonne, the Seine and the Rhône, which divides the Massif Central from the Alps and flows into the Mediterranean Sea at the Camargue, the lowest point in France (2m below sea level). Corsica lies off the Mediterranean coast.

France´s total land area, with its overseas departments and territories, is 674,843 km², 0.45% of the total land area on Earth. However, France possesses the second-largest Exclusive Economic zone (EEZ) in the world, covering 11,035,000 km², approximately 8% of the total surface of all the EEZs of the world, just behind the United States (11,351,000 km²) and ahead of Australia (8,232,000 km²).

Metropolitan France is situated between 41° and 51° North, on the western edge of Europe, and thus lies within the northern temperate zone. The north and northwest have a temperate climate, while a combination of maritime influences, latitude and altitude produce a varied climate in the rest of Metropolitan France. In the south-east a Mediterranean climate prevails. In the west, the climate is predominantly oceanic with a high level of rainfall, mild winters and cool to warm summers. Inland the climate becomes more continental with hot, stormy summers, colder winters and less rain.

Demography

With an estimated population of 65.1 million people, France is the 19th most populous country in the world. France´s largest cities are Paris, Marseille, Lyon, Lille, Toulouse, Nice, and Nantes.

In 2003, France´s natural population growth (excluding immigration) was responsible for almost all natural population growth in the European Union. In 2004,

population growth was 0.68% and then in 2005 the birth and fertility rates continued to increase. The natural increase of births over deaths rose to 299,800 in 2006. The total fertility rate rose to 2.02 in 2008, from 1.88 in 2002. In 2004, a total of 140,033 people immigrated to France. Of them, 90,250 were from Africa and 13,710 from Europe. In 2005, the immigration level fell slightly to 135,890.

It is illegal for the French state to collect data on ethnicity and race, a law with its origins in the 1789 revolution and reaffirmed in the constitution of 1958. Nonetheless, France is an ethnically diverse nation with about six million North Africans and an estimated 2.5 million blacks. It is currently estimated that 40% of the French population descends from different waves of migrations. According to the French National Institute for Statistics and Economic Studies, it has an estimated 4.9 million foreign-born immigrants, of which 2 million have acquired French citizenship. Trance is the leading asylum destination in Western Europe with an estimated 50,000 applications in 2005 (a 15% decrease from 2004). The European Union allows free movement between the member states. While Ireland did not impose restrictions, France put in place controls to curb Eastern European migration.

A perennial political issue concerns rural depopulation. Over the period 1960-1999 fifteen rural departments experienced a decline in population. In the most extreme case, the population of Creuse fell by 24 %.

According to Article 2 of the constitution, French is the sole official language of France since 1992. This makes France the only Western European nation (excluding microstates) to have only one officially recognised language. However, 77 regional languages are also spoken, in metropolitan France as well as in the overseas departments and territories. Until recently, the French government and state school system discouraged the use of any of these languages, but they are now taught to varying degrees at some schools. Other languages, such as Portuguese, Italian, Maghrebi Arabic and several Berber languages are spoken by immigrants.

Tourism

With 81.9 million foreign tourists in 2007, France is ranked as the principal tourist destination in the world, ahead of Spain and the United States. This 91.9 million figure excludes people staying less than 24 hours in France, such as northern Europeans crossing France on their way to Spain or Italy during the summer. France features cities of high cultural interest (Paris being the foremost), beaches and seaside resorts, ski resorts, and rural regions that many enjoy for their beauty and

tranquillity (green tourism). Aside from casual tourism France attracts a lot of religious pilgrims to Lourdes, a town in the Hautes-Pyrénées department, that hosts a few million tourists a year. Popular tourist sites include: the Eiffel Tower (6.2 million), the Louvre Museum (5.7 million), Palace of Versailles (2.8 million), Musée d´Orsay (2.1 million), Arc de Triomphe (1.2 million), Centre Pompidou (1.2 million), Mont-Saint-Michel (1 million), Château de Chambord (711,000), Saint-Chapelle (683,000), Château du Haut-Koenigsbourg (549,000), Puy de Dôme (500,000), Musée Picasso (441,000), Carcassonne (362,000).

TEXT VOCABULARY

To extend-rozprostírat se
Overseas-zámořský
Influence-vliv
To possess-mít/vlastnit
Member-člen
Metropolitan-týkající se mateřské země
To cover-mít rozlohu
Mountain range-horské pásmo
Coast-pobřeží
Edge-okraj
Maritime-přímořský
Altitude-zeměpisná šířka
Inland-vnitrozemí
Populous-zalidněný
Slightly-mírně
Diverse-různorodý
To curb-omezit
Excluding-kromě
To feature-vyznačovat se
Pilgrim-poutník
To border-hraničit
To link-spojit
Empire-říše
Purchasing power parity-parita kupní síly
Nuclear power plant-jaderná elektrárna
Government-vláda
Plain-planina
Extensive-rozsáhlý
Surface-plocha
Temperate zone-mírný pás
Latitude-zeměpisná výška
To prevail-převažovat
To estimate-odhadovat
Growth-růst
To reaffirm-potvrdit
Foreign-born-narozený v jiném státě
Sole-jediný
To rank-patřit/zaujímat místo
Tranquillity-klid
To include-zahrnovat

Define the following expressions: empire, pilgrim, tranquillity, coast, mountain range, to border, populous, latitude

IDEAS FOR DISCUSSION:

Describe the geography of France.

How would you describe the inland climate?

How many tourists a year visit the Eiffel Tower?

How many and what countries does France border with?

What do pilgrims visit in France?

What is the highest peak in Western Europe?

What is the estimated population of France?

How many languages are spoken in metropolitan France as well as in the overseas departments and territories?

1.1 EXERCISE:

Decide which answer A, B, or C best fits each space.

1) They were all found guilty of illegally.....guns.
   a) possessing **b)** possession **c)** possessed
2) They use the TV as a device to .....people.
   a) influential **b)** fluent **c)** influence
3) .....is someone who travels to a holy place that is important in their religion.
   a) pilgrimage **b)** pilgrim **c)** wanderer
4) The Rocky Mountains are lower in .....than the Himalayas.
   a) altimeter **b)** latitude **c)** altitude
5) .....means spreading over a large area.
   a) extinct **b)** extensive **c)** extended
6) .....is an area of land beside a sea.
   a) coast **b)** inland **c)** shore
7) The .....has announced plans to raise the minimum wage next year.
   a) governor **b)** state **c)** government
8) The canal is .....by poplar trees.
   a) bordered **b)** borders **c)** boredom

1B GRAMMAR - PRESENT TENSES

PRESENT SIMPLE

- facts which are always true *(The river Nil flows into the Mediterranean Sea.)*
- habitual actions *(He always sits in his chair.)*
- to describe what happens in a film, book
- when something happens regularly *(I usually take the bus to work.)*

PRESENT CONTINUOUS

- action in progress-temporary *(I am living with my friends.)*
  -not finished *(I´m doing washing up.)*
- an annoying habit *(You are always losing the keys.)*
- I am in the middle of doing something *(I am playing tennis.)*
- the action is not necessarily happening at the time of speaking.*(She´s learning Italian.)*

PRESENT PERFECT SIMPLE

- without a definite time *(I have been in Italy several times.)*
- it is completed *(I´ve written 10 pages of my homework.)*
- describes a state which has lasted up to the present *(I´ve never eaten oysters.)*
- usually new information *(I´ve cut my finger.)*
- we can use this tense with **just, already, yet** *(I´ve just had lunch.)*
  (He´s already gone.) *(I haven´t sent it yet.)*
- it´s the (first, second,..) time something has happened. *(It´s the first time he has driven a car.)*

PRESENT PERFECT CONTINUOUS

- not completed or has recently finished *(I have been walking for 10 hours.)*
  (He has been watching TV all day.)
- we use the continuous to say **how long** *(They´ve been playing tennis since 2 o´clock.) (How long have you been reading that book?)*

COMPARE THESE EXAMPLES:

My hands are dirty. I´ve been repairing the car. **x** The car is OK again now. I´ve repaired it.

1.2 EXERCISE

Decide which answer A, B, C or D best fits each space.

1) I´m busy at the moment. .....on the computer.
   a)I work **b)** I´m work **c)**I´m working **d)** I working
2) My friend.....the answer to the question.
   a)is know **b)** know **c)** knowing **d)** knows
3) I think I ´ll buy these shoes. .....really well.
   a)They fit **b)** They have fit **c)**They´re fitting **d)** They were fitting
4) Here´s my report. .....it at last.
   a)I finish **b)** I finished **c)**I´m finished **d)** I´ve finished
5) I´ve .....made some coffee. It´s in the kitchen.
   a)ever **b)** just **c)**never **d)** yet
6) Robert .....ill for three weeks. He´s still in hospital.
   a)had been **b)** has been **c)** is **d)** was
7) My arms are aching now because.....since two o´clock.
   a)I ´m swimming **b)** I swam **c)**I swim **d)** I´ve been swimming
8) I´m very tired.....over four hundred miles today.
   a) I drive **b)** I´m driving **c)** I´ve been driving **d)** I´ve driven

2A GREEK MATHEMATICS

LEAD IN

Greek mathematics, as that term is used in this article, is the mathematics written in Greek, developed from the 7th century BC to the 4th century AD around the Eastern shores of the Mediterranean. Greek mathematicians lived in cities spread over the entire Eastern Mediterranean, from Italy to North Africa, but were united by culture and language. Greek mathematics of the period following Alexander the Great is called Hellenistic mathematics. The word "mathematics" itself derives from the ancient Greek word (mathema) meaning "subject of instruction". The study of mathematics for its own sake and the use of generalized mathematical theories and proofs is the key difference between Greek mathematics and those of preceding civilizations.

TEXT

Origins of Greek mathematics

The origins of Greek mathematics are not easily documented. The earliest advanced civilizations in the country of Greece and in Europe were the Minoan and later Mycenean civilization, both of which flourished during the 2nd millennium BC. While these civilizations possessed writing and were capable of advanced engineering, including the construction of four-stored palaces with drainage and beehive tombs, they left behind no mathematical documents. Though no direct evidence is available, it is generally thought that the neighbouring Babylonian and Egyptian civilization had an influence on the younger Greek tradition. Between 800 BC and 600 BC Greek mathematics generally lagged behind Greek literature, and there is very little known about Greek mathematics from this period-nearly all of which was passed down through later authors, beginning in the mid 4th century BC.

Achievements

Greek mathematics constitutes a major period in the history of mathematics, fundamental with respect to geometry connected with the idea of formal proof. Greek mathematics also contributed significantly to ideas the number theory, mathematical analyses, applied mathematics, and at times, came close to integral calculus.

Well-known figures in Greek mathematics include Pythagoras, a shadowy figure from the isle of Samos associated partly with number mysticism and

numerology, but more commonly with his theorem, and Euclid, who is known for his Elements, a canon of geometry for many centuries.

The most characteristic product of Greek mathematics may be the theory of conic sections, largely developed in the Hellenistic period. The methods used made no explicit use of algebra, nor trigonometry.

Transmission and the manuscript tradition

Although the earliest Greek language texts on mathematics that have been found were written after the Hellenistic period, many of these are considered to be copies of works written during and before the Hellenistic period. Nevertheless, the dates of Greek mathematics are more certain than the dates of earlier mathematical writing, since a large number of chronologies exist that, overlapping with other documents, record events year by year up to the present day. Even so, many dates are uncertain; but the doubt is a matter of decades rather than centuries.

PYTHAGORAS

Pythagoras of Samos was an Ionian Greek philosopher, mathematician, and founder of the religious movement called Pythagoreanism. Most of the information about Pythagoras was written down centuries after he lived, so that very little reliable information is known about him. He was born on the island of Samos, and may have travelled widely in his youth, visiting Egypt and other places seeking knowledge. He had a teacher named Themistoclea, who introduced him to the principles of ethics. Around 530 BC, he moved to Croton, a Greek colony in southern Italy, and there set up a religious sect. His followers pursued the religious rites and practices developed by Pythagoras, and studied his philosophical theories. The society took an active role in the politics of Croton, but this eventually led to their downfall. The Pythagorean meeting-places were burned, and Pythagoras was forced to flee the city. He ended his days in Metapontum.

Pythagoras made influential contributions to philosophy and religious teaching in the late 6th century BC. He is often revered as a great mathematician, mystic and scientist, and he is best known for the Pythagorean theorem which bears his name. However, because legend and obfuscation cloud his work even more than with the other pre-Socratic philosophers, one can say little with confidence about his teachings, and some have questioned whether he contributed much to mathematics and natural philosophy at all. Many of the accomplishments credited to Pythagoras may actually have been accomplishments of his colleagues and successors.

Whether or not his disciples believed that everything was related to mathematics and that numbers were the ultimate reality is unknown. It was said that he was the first man to call himself a philosopher, of lover of wisdom, and Pythagorean ideas exercised a marked influence on Plato, and through him, all of Western philosophy.

Writings

No texts by Pythagoras are known to have survived, although forgeries under his name-a few of which remain extant-did circulate during antiquity. Critical ancient sources like Aristotle and Aristoxenus cast doubt on these writings. Ancient Pythagoreans usually quoted their master´s doctrines with the phrases *autos ephe* ("he himself said") – emphasizing the essentially oral nature of his teaching.

Mathematics

The so-called Pythagoreans, who were the first to take up mathematics, not only advanced this subject, but saturated with it, they fancied that the principles of mathematics were the principles of all things. **The Pythagorean theorem:** The sum of the areas of the two squares on the legs (a and b) equals the area of the square on the hypotenuse (c). Since the fourth century AD, Pythagoras has commonly been given credit for discovering the Pythagorean theorem, a theorem in geometry that states that in a right-angled triangle the square of the hypotenuse (the side opposite the right angle), c, is equal to the sum of the squares of the other two sides, b and a-that is, $a^2+b^2 = c^2$. While the theorem that now bears his name was known and previously utilized by the Babylonians and Indians, he or his students, are often said to have constructed the first proof. It must, however, be stressed that the way in which the Babylonians handled Pythagorean numbers implies that they knew that the principle was generally applicable, and knew some kind of proof, which has not yet been found in the cuneiform sources. Because of the secretive nature of his school and the custom of its students to attribute everything to their teacher, there is no evidence that Pythagoras himself worked on or proved this theorem. For that matter, there is no evidence that he worked on any mathematical or meta-mathematical problems. Some attribute it to a carefully constructed myth by followers of Plato over two centuries after the death of Pythagoras, mainly to bolster the case for Platonic meta physics, which resonates well with the ideas they attributed to Pythagoras. The earliest known mention of Pythagoras´s name in connection with the theorem occurred five centuries after his death, in the writings of Cicero and Plutarch.

Musical theories and investigation

According to legend, the way Pythagoras discovered that musical notes could be translated into mathematical equations was when one day he was passing some blacksmiths at work, he thought that the sounds emanating from their anvils being hit were beautiful and harmonious and decided that whatever scientific law caused this to happen must be mathematical and could be applied to music. He went to the blacksmiths to learn how this had happened by looking at their tools, he discovered that it was because the hammers were "simple ratios of each other, one was half the size of the first, another was 2/3 the size, and so on." Pythagoreans elaborated on a theory of numbers, the exact meaning of which is still debated among scholars. Another belief attributed to Pythagoras was that of the "harmony of the spheres". Thus the planets and stars moved according to mathematical equations, which corresponded to musical notes and thus produced a symphony.

INFLUENCE

Influence on Plato

Pythagoras, or in a broader sense, the Pythagoreans, allegedly exercised an important influence on the work of Plato. According to R.M. Hare, this influence consists of three points: 1) The platonic Republic might be related to the idea of "a tightly organized community of like-minded thinkers", like the one established by Pythagoras in Croton. 2) There is evidence that Plato possibly took from Pythagoras the idea that mathematics and, generally speaking, abstract thinking is a secure basis for philosophical thinking as well as "for substantial theses in science and morals". 3) Plato and Pythagoras shared a "mystical approach to the soul and its place in the material world". It is probable that both were influenced by Orphism. Aristotle claimed that the philosophy of Plato closely followed the teachings of the Pythagoreans, and Cicero repeats this claim: *Platonem ferunt didicisse Pythagorea omnia* ("They say Plato learned all things Pythagorean"). Bertrand Russell, in his *A history of Western Philosophy,* contended that the influence of Pythagoras on Plato and others was so great that he should be considered the most influential of all Western philosophers.

Influence on esoteric groups

Pythagoras started a secret society called the Pythagorean brotherhood devoted to the study of mathematics. This had a considerable impact on future esoteric traditions, such as Rosicrucianism and Freemasonry, both of which were

occult groups dedicated to the study of mathematics and both of which claimed to have evolved out of the Pythagorean brotherhood. The mystical and occult qualities of Pythagorean mathematics are discussed in a chapter of Manly P. Hall´s *The Secret of All Ages* entitled "Pythagorean Mathematics". Pythagorean theory was tremendously influential on later numerology, which was extremely popular throughout the Middle East in the ancient world. The 8th century Muslim alchemist Jabir ibn Hayyan grounded his work in an elaborate numerology greatly influenced by Pythagorean theory. Today, Pythagoras is revered as a prophet by the *Ahl al-Tawhid* or Druze faith along with his fellow Greek, Plato.

TEXT VOCABULARY

Origin-počátek
Drainage-kanalizace
Major-důležitý
Shadowy-nejasný
Canon-zákon
Explicit-jednoznačný/jasný
Movement-hnutí
Knowledge-poznatky
Downfall-pád
Obfuscation-zmatek
Influence-vliv
To doubt-zpochybni
Sum-součet
Hypotenuse-přepona
To utilize-využívat
Applicable-užitečný
To attribute-pokládat
Blacksmith-kovář
Simple ratios-prostý poměr
Broader-širší
Approach-stanovisko
Brotherhood-bratrstvo
To evolve-vyvinout se
Elaborate-důkladný
Capable of-být schopný
Lag-zaostávat
To contribute to-přispět
To associate-spojovat
Conic section-profil kuželosečky
Overlapping-přečnívající
Reliable-spolehlivý
To pursue-sledovat
Contribution-přispění
Accomplishment-úspěch
Forgeries-padělky
To saturate-nasytit se
Leg-odvěsna
To equal-rovnat se
To imply-naznačovat
Cuneiform-klínový
Equation-rovnice
Law-zákon
Thus-a tudíž
Allegedly-údajně
To contend-tvrdit
To devote-být zasvěcen
Tremendously-ohromně

Define the following expressions: forgeries, sum, downfall, brotherhood, equation, blacksmith, to evolve

IDEAS FOR DISCUSSION

What was Pythagoras´s influence on Plato?

What texts by Pythagoras are known to have survived?

Describe the origin of Greek mathematics.

What does the ancient Greek word (mathema) mean?

When were the earliest Greek language texts on mathematics written?

What secret society did Pythagoras start?

What does legend say about the way Pythagoras discovered that musical notes could be translated into mathematical equations?

2.1 EXERCISE:

Decide which answer A, B, or C best fits each space.

1) Meteorites may hold clues about the.....of life on Earth.
   a)origami **b)** origin **c)** original
2) No decision had been made, and .....the situation remained unclear.
   a) although **b)** anyway **c)** thus
3) .....is a group of people, especially a group of men, who have similar interests or who do the same job.
   a)brotherhood **b)** brother-in-la **c)** brother
4) A/an.....is a total amount made by adding several numbers or amounts together.
   a)sum **b)** sum up **c)** summary
5) There seems to be some .....as to whether this is legal.
   a)believe **b)** hesitate **c)** doubt
6) .....means something difficult that you succeed in doing, especially after working hard over a period of time
   a)failure **b)** accomplishment **c)** accomplice
7) He played .....well.
   a)tremendously **b)** horribly **c)** enormously
8) .....is the longest side of a right-angled triangle
   a)Hypothesis **b)** Leg **c)** Hypotenuse

2B GRAMMAR-FUTURE TENSES

WILL / SHALL

- to make predictions *(I think it will rain tomorrow.)*
- decision made at the time of speaking *(Did you phone Lucy? Oh no, I´ll phone her now.)*
- **shall** is used mostly in questions *(Shall we go? Shall I open the window?)*
- we often use will with **probably, I think, I wonder, I expect,....**

GOING TO

- we have already decided to do something *(She´s going to buy a new car.)*
- we can see the cause of the event *(You are going to fall.)*
- to describe a present intention *(I am going to fix the TV.)*

FUTURE CONTINUOUS

- describe a situation in the future at a particular time *(This time next week we will be lying on the beach.)*
- to predict a future state or habit *(In ten years time I expect I´ll be living in London.)*

FUTURE PERFECT SIMPLE

- to emphasise the completion of an event, something will already be completed before a time in the future *(We are late. The film will already have started by the time we get there.)*

PRESENT CONTINUOUS

- to describe plans and arrangements which are definite *(I can´t help you, I am leaving tomorrow.)*

PRESENT SIMPLE

- facts, timetable, law *(The bus leaves at 9.30)*

2.2 EXERCISE:

Put the verb into the correct form.

1) I feel a bit hungry. I think..... (I/have) something to eat.
2) Why are you putting on your coat?..... (you /go) somewhere?
3) What time..... (I/phone) you this evening? About 7.30?
4) Look! That plane is flying towards the airport. .....(it/land)
5) We must do something soon, before..... (it/be) too late.

6) .....(I/go) to London next weekend for a wedding. My sister..... (get married).

7) I´m not ready yet.....(I/tell) you when.....(I/be) ready.
I promise...(I/not/be) very long.

8) I wonder where..... (we/live) ten years from now?

3A HERBALISM

LEAD IN

Herbalism is a traditional medicinal or folk medicine practice based on the use of plants and plant extracts. Herbalism is also known as botanical medicine, medical herbalism, herbal medicine, herbology, and phytotherapy. The scope of herbal medicine is sometimes extended to include fungal and bee products, as well as minerals, shells and certain animal parts.

TEXT

Unlike many forms of alternative medicine, herbalism is widely considered by the medical community to have a scientific basis and even plays an important role in the formulation of many medications and dietary supplements, such as oripavine and vitamin C supplements. Many plants synthesize substances that are useful to the maintenance of health in humans and other animals. These include aromatic substances, most of which are phenols or their oxygen-substituted derivatives such as tannins. Many are secondary metabolites, of which at least 12,000 have been isolated-a number estimated to be less than 10% of the total. In many cases, substances such as alkaloids serve as plant defence mechanisms against predation by microorganisms, insects, and herbivores. Many of the herbs and spices used by humans to season food yield useful medicinal compounds.

Similar to prescription drugs, a number of herbs are thought to be likely to cause adverse effects. Furthermore, “adulteration, inappropriate formulation, or lack of understanding plant and drug interactions have led to adverse reactions that are sometimes life threatening or lethal.” Herbalists are often trained to take well-established risks into consideration when patients consult them.

Anthropology of herbalism

People on all continents have used hundreds to thousands of indigenous plants for treatment of ailments since prehistoric times. Medicinal herbs were found in the personal effects of an “ice man”, whose body was frozen in the Swiss Alps for more than 5,300 years. These herbs appear to have been used to treat the parasites found in his intestines. Anthropology of anthropologists theorize that animals evolved a tendency to seek out bitter plant parts in response to illness. Indigenous healers often claim to have learned by observing that sick animals change their food preferences to nibble at bitter herbs they would normally reject. Field biologists have

provided corroborating evidence based on observation of diverse species, such as chimpanzees, chickens, sheep and butterflies. Lowland gorillas take 90% of their diet from the fruits of *Aframomum meleqeta,* a relative of the ginger plant, that is a potent antimicrobial and apparently keeps shigellosis and similar infections at bay. Researchers from Ohio Wesleyan University found that some birds select nesting material rich in antimicrobial agents which protect their young from harmful bacteria. Sick animals tend to forage plants rich in secondary metabolites, such as tannins and alkaloids. Since these phytochemicals often have antiviral, antibacterial, antifungal and antihelminthic properties, a plausible case can be made for self-medication by animals in the wild. Some animals have digestive systems especially adapted to cope with certain plant toxins. For example, the koala can live on the leaves and shoots of the eucalyptus, a plant that is dangerous to most animals. A plant that is harmless to a particular animal may not be safe for humans to ingest. A reasonable conjecture is that these discoveries were traditionally collected by the medicine people of indigenous tribes, who then passed on safety information and cautions. The use of herbs and spices in cuisine developed in part as a response to the threat of food-borne pathogens. Studies show that in tropical climates, where pathogens are the most abundant, recipes are the most highly spiced. Further, the spices with the most potent antimicrobial activity tend to be selected. In all cultures vegetables are spiced less than meat, presumably they are more resistant to spoilage.

Role of herbal medicine in modern human society

The use of herbs to treat disease is almost universal among non-industrialized societies. A number of traditions came to dominate the practice of herbal medicine at the end of the twentieth century:

- The “classical” herbal medicine system, based on Greek and Roman sources
- The Siddha and Ayurvedic medicine systems from various South Asian Countries
- Chinese herbal medicine (Chinese herbology)
- Traditional African medicine
- Unani-Tibb medicine
- Shamanic herbalism: a catch-all phrase for information mostly supplied from South America and the Himalayas

Many of the pharmaceuticals currently available to physicians, have a long history of use as herbal remedies, including opium, aspirin, digitalis, and guanine. The World Health Organization (WHO) estimates that 80% of the world´s population presently uses herbal medicine for some aspect of primary health care. Pharmaceuticals are prohibitively expensive for most of the world´s population, half of which lives on less than $2 per day. In comparison, herbal medicines can be grown from seed or gathered from nature for little or no cost. Herbal medicine is a major component in all traditional medicine systems, and a common element in Siddha, Ayurvedic, homeopathic, naturopathic, traditional Chinese medicine, and Native American medicine. The use of, and search for, drugs and dietary supplements derived from plants have accelerated in recent years. Pharmacologists, microbiologists, botanists, and natural-products chemists are combing the Earth for phytochemicals and leads that could be developed for treatment of various diseases. In fact, according to the World Health Organisation, approximately 25% of modern drugs used in the United States have been derived from plants.

Types of herbal medicine systems

Use of medicinal plants can be as informal as, for example, culinary use or consumption of an herbal tea or supplement, although the sale of some herbs are provided to professional herbalists by specialist companies. Many herbalists, both professional and amateur, often grow or “wildcraft” their own herbs. Some researchers trained in both western and traditional Chinese medicine have attempted to deconstruct ancient medical texts in the light of modern science. One idea is that the yin-yang balance, at least with regard to herbs, corresponds to the pro-oxidant and anti-oxidant balance. This interpretation is supported by several investigations of the ORAC rating of various yin and yang herbs. In America, early settlers relied on plants imported from Europe, and also from local Indian knowledge. One particularly successful practitioner, Samuel Thomson developed a hugely popular system of medicine. This approach was subsequently broadened to include concepts introduced from modern physiology, a discipline called Physiomedicalism. Another group, the Eclectics, were a later offshoot from the orthodox medical profession, who were looking to avoid the then current medical treatments of mercury and bleeding, and introduced herbal medicine into their practices. Both groups were eventually overcome by the actions of the American Medical Association, which was formed for this purpose. Cherokee medicine tends to divide herbs into foods, medicines and

toxins and to use seven plants in the treatment of disease, which is defined with both spiritual and physiological aspects, according to Cherokee herbalist David Winston.

In India, Ayurvedic medicine has quite complex formulas with 30 or more ingredients, including a sizeable number of ingredients that have undergone "alchemical processing", chosen to balance "Vata", "Pitta" or "Kapha".

In Tamil Nadu, Tamils have their own medicinal system now popularly called the Siddha medicinal system. The Siddha system is entirely in the Tamil language. It contains roughly 300,000 verses covering diverse aspects of medicine such as anatomy, herbal, mineral and metallic compositions to cure many diseases that are relevant even today. Ayurveda is in Sanskrit, but Sanskrit was not generally used as a mother tongue and hence its medicines are mostly taken from Siddha and other local traditions.

Many traditional African remedies have performed well in initial laboratory tests to ensure they are not toxic and in tests on animals. Gawo, a herb used in traditional treatments, has been tested in rats by researchers from Nigeria´s University of Jos and the National Institute for Pharmaceutical Research and Development. According to research in the African Journal of Biotechnology, Gawo passed tests for toxicity and reduced induced fevers, diarrhoea and inflammation.

TEXT VOCABULARY

Fungal-plísňový
Maintenance-zachování
Compounds-látka
Ailments-nemoc
To evolve-vyvinout se
Diverse-různý
Harmful-škodlivý
Certain-některý
Indigenous-domorodý
Abundant-hojný
To treat-léčit
To gather-získat
Treatment-léčba
Culinary-kulinářský
Approach-přístup
Supplements-doplňky
Predation-napadení
Adverse-nežádoucí
Intestines-střeva
To nibble-okusovat
Potent-silný
Plausible-přijatelný
To ingest-požít
Tribes-kmen
Spoilage-znehodnocení
Including-včetně
Component-složka
According to-podle
Investigation-vyšetřování
Mercury-rtuť

Ingredients-složky
To cure-léčit
Hence-a proto
Inflammation-záňět

Define the following expressions: fungal, inflammation, indigenous, supplement, treatment, tribe, ailment

IDEAS FOR DISCUSSION

What is herbal medicine used for?

Since when have people on all continents used thousands of indigenous plants for the treatment of ailments?

Is a plant that is harmless to a particular animal necessarily safe for humans to ingest? Why?

What traditions came to dominate the practice of herbal medicine at the end of the twentieth century?

What percentage of modern drugs used in the United States have been derived from plants?

Who was the successful practitioner, who developed a hugely popular system of medicine in the USA?

How many ingredients has Ayurvedic medicine in India?

3.1 EXERCISE:

Decide which answer A, B, or C best fits each space.

1) Sheep were .....the grass.
   a)biting **b)** nibble **c)** nibbling
2) .....is an illness, usually not a serious one.
   a)Complaint **b)** Indisposition **c)** Ailment
3) .....people lived in a place for a very long time before other people came to live there.
   a)indigent **b)** Indigenous **c)** Indigo
4) Crime is on the increase,.....the need for more police.
   a)hence **b)** hen **c)** hance
5) Dietary .....may not help with this condition.
   a)supplementary **b)** support **c)** supplements
6) A.....is a large group of related families who live in the same area and share a common language, religion and customs.
   a)tribe **b)** house **c)** tribal

7) A/An.....is an area on your body that is swollen, red, and painful because of an infection or injury.
   a)inflation **b)** inflammation **c)** swelling
8) A bomb was the only .....explanation for the crash.
   a)plausible **b)**plausibility **c)** implausible

3B QUESTION FORMS & SUBJECT/OBJECT QUESTION

Yes/No questions

Is he a teacher? Yes he is.

Can you swim? No, I can't.

Have they got a car? Yes they have.

To form yes/no questions where there is an auxiliary verb or a modal verb, we invert the word order of a positive sentence. (*He is a teacher > Is he a teacher?*)

Do you eat fish? No I don't.

Does she know you. Yes she does.

When there is no auxiliary verb we use '*do*' to form the question.

With question words

The same rules apply when there is a question word (*'what', 'where', 'when', 'why', 'who', 'which', 'how', 'how much', 'how many'*)

Where is the hotel?

What can you smell?

Who has just arrived?

Where there is an auxiliary or modal verb, that verb is used to form the question.

How did you get here?

When do your parents get back?

How much does it cost?

Where there is no auxiliary verb, we use *do*.

Subject/Object questions

Sometimes you might see questions like this.

Who broke the window?

What happened next?

Who told you that?

There is no auxiliary verb and the word order is not inverted.

These are called subject questions – because the question word is the subject of the sentence.

Look at these two questions.

Who does Romeo love? Romeo loves Juliet.

Who loves Romeo? Juliet loves Romeo.

In the first question, Romeo is the subject of the verb.

In the second question 'who' is the subject and Romeo is the object.

3.2 EXCERCISE:

Put the words in the right order and ask the question.

1) been / have / where / you
2) do / postcard / sell / you
3) belong / calculator / does / this / to / who
4) are / here / how / long / staying / you
5) is / like / new / office / what / your
6) are / flights / full / of / the / which
7) carnival / does / start / the / time / what
8) decided / has / holiday / Nancy / on / what

4A LAPTOPS

LEAD-IN

A **laptop**, also called a **notebook**, is a personal computer for mobile use. A laptop integrates most of the typical components of a desktop computer, including a display, a keyboard, a pointing device (a touchpad, also known as a trackpad, and/or a pointing stick) and speakers into a single unit. A laptop is powered by mains electricity via an AC adapter, and can be used away from an outlet using a rechargeable battery. Portable computers, originally monochrome CRT-based and developing into the modern laptops, were originally considered to be a small niche market, mostly for specialized field applications such as the military, accountants and sales representatives. As portable computers became smaller, lighter, cheaper, more powerful and as screens became larger and of better quality, laptops became very widely used for all sorts of purposes.

TEXT

One of the original laptops was the GRiD Compass 1101. It was used by astronauts on space missions in the early 1980s. It weighed 5kg and cost US $8,000-$10,000. Laptops today weigh less than one-half the weight and cost less than one-third the price of the GRiD. The compact design, convenience, and evolving technology of laptops have made them as popular as desktops.

Personal Digital Assistants (PDAs) and smartphones are examples of portable, hand held devices that are becoming more popular. PDAs offer features such as games, web surfing, e-mail, instant messaging, and many other features offered by PCs. Smartphones are cell phones with many built-in PDA capabilities. PDAs and smartphones can run some of the same software as laptops.

Notebooks hardware

The smartphone is a mobile phone with PDA capabilities. Smartphones combine cell phone and computer functions in a single, handheld device. They may include these additional options: built-in camera, document access, e-mail, abbreviated note-taking, television. Smartphone connectivity and PDA connectivity include Bluetooth and regular USB cable connections.

Laptop and desktop computers use the same types of ports so that peripherals can be interchangeable. These ports are specifically designed for connection peripherals, providing network connectivity, and providing audio access. Ports, connections, and

drives are located on the front, back and sides of the laptop due to the compact design. Laptops contain PC Card or ExpressCard slots to add functionality such as more memory, a modem, or a network connection. Laptops require a port for external power. Laptops can operate using either a battery or an AC power adapter. This port can be used to power the computer or to charge the battery. Status indicators, ports, slots, connectors, bays, jacks, vents, and a keyhole are on the exterior of the laptop.
Three LEDs on the top of the laptop: bluetooth, battery, standby.
Three components on the back of the laptop: parallel port, AC power connector, battery bay
A laptop operates using either a battery or an AC power adapter. Laptop batteries are manufactured in various shapes and sizes. They use different types of chemicals and metals to store power. Some input devices might need to be configured or optimized for speed, sensitivity, scrolling, or the number of taps needed. To gain access to these configuration utilities for input devices, use the following path: Start-Control panel-Mouse.
Not all devices can be configured through the Control Panel. When you install the software for some devices, programs might be installed in the All Programs section of the Start menu. These programs are used to configure more advanced settings.
A laptop monitor is a built-in LCD. It is similar to a desktop LCD monitor, except that the resolution, brightness, and contrast settings can be adjusted using software or button controls. The laptop monitor cannot be adjusted for height and distance because it is integrated into the lid of the case. A desktop monitor can be added to a laptop. An Fn key on the laptop keyboard toggles between the laptop display and the desktop monitor. The purpose of the Fn key is to activate a second function on a dual-purpose key. The feature that is accessed by pressing and holding the Fn key is printed on another key in a smaller font or different colour. There are several functions that can be accessed: volume setting, display brightness, sleep states, wireless functionality, check battery status.
The Fn key must not be confused with function keys F1 through F12. These keys are typically located in a horizontal row across the top of the keyboard. Their function depends on the operating system and application that is running when they are pressed. Each key can be made to perform up to seven separate operations. The key can be pressed alone or with one or more combinations of the Shift, Control, and Alt keys. On many laptops, a small pin on the laptop cover contacts a switch when

the case is closed, called an LCD cutoff switch. The LCD cutoff switch tells the CPU to conserve power by extinguishing the backlight and turning off the LCD. If this switch breaks or is dirty, the LCD remains dark while the laptop is open.

The CPU is the brain of the computer. The CPU interprets and processes instructions that are used to manipulate data. Laptop processors are designed to use less power and create less heat than desktop processors. As a result, laptop processors do not require cooling devices that are as large as those found in desktops. Laptop processors also use CPU throttling to modify the clock speed as needed to reduce power consumption and heat. This results in a slight decrease in performance. It also increases the lifespan of some components. These specially designed processors allow laptops to operate for a longer period of time when using a battery power source. Desktops are usually set up in a location where they remain plugged into a power source. Desktop power management distributes electricity from the source to the components of the desktop. There is also a small battery in the desktop that provides electricity to maintain the internal clock and BIOS settings when the desktop is powered off.

Notebook storage data

The optical drive is a storage device that uses lasers to read data on the optical medium. Optical drives have moving parts like hard drives. They have drive motors designed to spin a platter and move a drive head. There are three types of optical drive: CD, DVD, Blue-ray Disc (BD)

CD, DVD, and BD media can be pre-recorded (read-only), recordable (write once), or re-recordable (read and write multiple times). CDs have a data storage capacity of approximately 700MB. DVDs have a data storage capacity of approximately 8.5 GB on one side of the disc. BDs have a storage capacity of 25 GB on a single-layer disc, and 50 GB on a dual-layer disc.

PC Cards follow the PCMCIA standards. They come in three types: Type I, Type II and Type III. Each type of PC Card is different in size and can attach to different devices. A newer type of PC Card is called the PC ExpressCard. The PC ExpressCard comes in 34 mm and 54 mm widths.

To allow applications and processes to run smoothly, it might be necessary to configure and allocate system resources, install additional components and plug-ins, or change environmental settings to match software requirements. Adding external components is usually accomplished through the use of Plug and Play, but

occasionally driver installation and additional configuration might be required. Proper configuration of the power setting helps you get the maximum performance from a laptop, such as increasing the length of time the laptop can be used on battery power. With laptops, it might be necessary to exchange components as needed to accomplish different tasks and respond to changing situations and needs. A laptop can be customized for specific purposes by adding external components. For example, a second hard drive can be installed in a laptop to provide additional storage capacity. Components need to be carefully inserted or connected to bays, connectors, and propriety expansion areas to avoid damage to the equipment. It is important to follow safe removal procedures when disconnecting hot-swappable and non-hot-swappable devices.

Network connection

Bluetooth is a wireless technology that enables device like a Laptop or PDA to communicate over short distances. A Bluetooth device can connect up to seven other Bluetooth devices to create a Wireless Personal Area Network (WPAN). Bluetooth devices are capable of handling voice, music, videos, and data and are ideally suited for connecting the following devices: laptops, printers, cameras, PDAs, cell phones.

The distance of a Bluetooth Personal Area Network (PAN) is limited by the amount of power used by the devices in the PAN. Bluetooth devices are broken into three classifications. The most common Bluetooth network is Class 2, which has a range of approximately 10 m.

Bluetooth devices operate in the 2.4 to 2.485 GHz radio frequency range, which is in the Industrial, Scientific, and Medical (ISM) band. This band often does not require a license if approved equipment is used. The Bluetooth standard incorporates Adaptive Frequency Hopping (AFH). AFH allows signals to “hop” around using different frequencies within the Bluetooth range, thereby reducing the chance of interference when multiple Bluetooth devices are present. AFH also allows the device to learn frequencies that are already in use and to choose a different subset of frequencies hopping.

Security measures are included in the Bluetooth standard. The first time that a Bluetooth device connects, the device is authenticated using a Personal Identification Number (PIN). Bluetooth supports both 128-bit encryption and PIN authentication.

Infrared (IR) wireless technology is a low-power, short-range wireless technology. IR transmits data using LEDs and receives data using photodiodes. IR wireless networks are globally unregulated. However, the Infrared Data Association (IrDA) defines the specifications for IR wireless communication.

There are four types of IR networks:

- Line of sight-the signal is transmitted only if there is a clear, unobstructed view between devices
- Scatter-the signal is bounced off ceilings and walls
- Reflective-the signal is sent to an optical transceiver and is redirected to the receiving device
- Broadband optical telepoint transmission can handle high-quality multimedia requirements

TEXT VOCABULARY

Compact-kompaktní, pevný
Capability-schopnost
Connectivity-spojení
Access-přístup
Standby-záloha/rezerva
Input-vstup/vložit
Built-in –vestavěný
Lid-víko
Brightness-jas
Device-zařízení
Lifespan-životnost
Plug into-napojit se
To spin-roztočení
Re-recordable-přepisovatelný
Smoothly-hladce
External-vnější
To accomplish-splnit
Inconvenient-nevyhovující
Efficiently-výkonně/účinně
Range-rozmezí
Interference-rušení

Portable-přenosný
Handheld-ruční
Interchangeable-zaměnitelný
Vent-ventilace
To store-uložit
Advanced-pokročilý
To adjust-nastavit
Toggle-přepínat
Row-řádek
To decrease-snížit
Set up-nastavit
Storage-ukládání/paměť
Platter-kotouč/disc
Single-layer-jednovrstvý
To allocate-přidělit
To exchange-vyměnit
Feature-rys/znak
Increasing-zvyšující se
To enable-umožňovat
Band-rozsah
Subset-podmnožina

Encryption-šifrování
Low-power-nízkonapěťový
Unobstructed-ničím nerušený
To bounce-odrazit
Transceiver-vysílač

Define the following expressions: to spin, encryption, connectivity, platter, to adjust, feature,

IDEAS FOR DISCUSSION:

What does PDA mean?
How would you describe a laptop?
What are the advantages of notebooks?
Describe a laptop monitor.
What are the types of IR networks? Describe each of them.
Give a definition of Bluetooth.
What does an optical drive mean?
When was the GRiD Compass 1101 used?

4.1 EXERCISE:

Decide which answer A, B, or C best fits each space.

1) .....is a small group of people or things that is a part of a large group.
   a) subside **b)** subset **c)** subsidy
2) The design can be .....on a floppy disc.
   a)stored **b)** storage **c)** storey
3) Computers become lighter, smaller, and more .....every year.
   a)portal **b)** port **c)** portable
4) .....-information put into a form called a code that other people are unable to read.
   a) encouragement **b)** encroachment **c)** encryption
5) Most televisions have a.....of ten years.
   a)lifestyle **b)** lifespan **c)** lifetime
6) The program accepts .....from a variety of sources.
   a) inquest **b)** input **c)** entry
7) .....means to move from one computer operation or program to another and back again by using one key or instruction.
   a)toggle **b)** switch **c)** toga

8) Each computer has its own distinctive.....

a)feat **b)** indication **c)** features

4B GRAMMAR - CONDITIONALS

0. CONDITIONAL

it is true, fact

PRESENT+PRESENT *Write another example:*

If you don´t water plants, they die. .....

1. CONDITIONAL

real situation, real possibility this will happen in future

PRESENT+WILL

If it rains, we are going to get wet. *Write another example:*

If I find it, I will tell you. .....

2. CONDITIONAL

an imaginary or unreal situation in present or future

PAST SIMPLE+WOULD+PRESENT *Write another example:*

If I were taller, I ´d join the basketball team. .....

modals are common

If you became a millionaire, you might be unhappy.

3. CONDITIONAL

unreal situation in the past

PAST PERFECT+WOULD+PRESENT PERFECT *Write another example:*

If you had tried harder, you might have succeeded. .....

4.2 EXERCISE

Put the verbs into the correct form.

1) If you .....a wallet in the street, what would you do with it? (find)
2) I must hurry. My friend will be annoyed if I .....on time. (not/be)
3) I didn´t realise that Gary was in hospital. If I ....., I would have gone to visit him. (know)
4) If the phone ....., can you answer it? (ring)
5) I can´t decide what to do. What would you do if you .....in my position? (be)

6) If you .....enough money to go anywhere in the world, where would you go? (have)
7) I´m glad we had a map. I´m sure we would have got lost if we.....one. (not/have)
8) The accident was your fault. If you .....more carefully, it wouldn´t have happened. (drive)

5A LONDON

LEAD IN

London is the capital of both England and the United Kingdom. It lies on the river Thames and covers an area of 1,580 square kilometres. Almost 7 million people live there and about 12 million in its conurbation (1987). It includes the City of London and 32 boroughs. London is the seat of the Monarch, the Parliament, the Government and the Supreme Court. It also contains many important museums, galleries, theatres and many historical buildings and parks. The Prime Meridian of the World runs across Greenwich in the east of London.

TEXT

The city of London has been a self-governing enclave from the 12th century and it is headed by the Lord Mayor. He enters his office with a ceremonial procession in November called the Lord Mayor´s Show. The ceremony dates back to the 14th century. The Lord Mayor´s official residence is the stately Mansion House. The City is the largest financial and commercial centre of Europe. It is known as the "square mile" (area of 274 hectares) and virtually regarded as the whole of Norman London.

Tales of torture, treasure and treason make the **Tower of London** the capital´s top tourist attraction. William the Conqueror began to build the massive fortress-the White Tower-to impress and dominate the people of London in 1066. Successive kings extended it and added to the fortifications. The Tower served till the 16th century as a royal home, a prison, an execution site, a royal mint and an observatory. There also used to be a royal menagerie. Now it is a museum where tourists go to see an arsenal of weapons, the Crown Jewels in the Jewel House, the prison where many famous prisoners were kept, the execution block where Henry VIII´s wives, Ann Boleyn and Catherine Howard, and philosopher Thomas More were beheaded.

Next to the Tower stands **Tower Bridge**, the most famous and distinctive bridge of London which is raised in the middle to allow ships to pass the river. Built in 1894, it takes 90 seconds to rise.

The river Thames played a vital part in establishing Britain as the world´s mightiest trading nation. Docks were developed along the riverbanks to the East including St. Katherine´s Dock close to the Tower of London. For more than a

century it bustled with commercial activity, now it has been transformed into a marina with a display of historic ships.

The largest and best-known church of the City is **St. Paul´s Cathedral**. Sir Christopher Wren´s masterpiece was completed after 35 years in 1711. It stands on the site of the previous cathedral which was damaged by the Great Fire of London in 1666. St. Paul´s is built in the Baroque style, the main nave is 170 metres long and it is the largest church in the world after St. Peter´s in Rome. St. Paul´s has seen many important occasions: Sir Winston Churchill´s funeral service or the wedding of Prince Charles and Princess Diana in 1981. Britain´s heroes are buried there – Admiral Nelson and the Duke of Wellington.

Not far from St. Paul´s Cathedral rises **the Monument** commemorating the place in Pudding Lane where the Great Fire of London started. It is about a 60 metre-high column whose 311 steps lead visitors to the terrace from which they can admire a beautiful view of the City.

The Houses of Parliament are the political centre of the United Kingdom, the home of the British Parliament. They were rebuilt in the Neo-Gothic style in 1840 on the site of the Old Palace of Westminster which was destroyed by fire. Almost the only remaining part of the old building, dating from 1097, is Westminster Hall. The Houses of Parliament became the seat of Parliament in 1547. Great Britain, with its House of Commons and House of Lords, is the oldest democracy in the world today. The parliamentary system as we know it today, throughout the world, can trace its roots to the British Magna Charta, an agreement between a British king and his nobles to share power in 1215. And 97,5 metres above the Parliament rises the clock tower called **Big Ben**, one of the best-known of London´s landmarks. Big Ben is not really the name of the clock, it is the name of the bell (named after Sir Benjamin Hall who gained recognition for having had it made). The strike of Big Ben is known world-wide because it is used by the BBC as a time signal.

Facing the House of Parliament, just across Parliament Square, is the most important church in the country-**Westminster Abbey**, where monarchs are crowned and heroes buried. Parliament Square is the area where the site of the Benedictine Abbey, known as the "West Monastery", used to stand, from which the name of Westminster sprung. It is a lawn with statues of renowned statesmen (Sir Winston Churchill, Abraham Lincoln, and Benjamin Disraeli). The history of Westminster Abbey goes back to the 11th century although many parts were added later. You can

see the Coronation chair, made in 1300 and containing the historic Stone of Scone, a symbol of Scottish Royalty, which was carried off to Westminster by Edward I. Almost all coronations since William the Conqueror (1066) have been held there, and many British kings and queens are buried in the Abbey. In the Poet´s Corner are the tombstones and monuments of some famous poets (such as John Milton, Walter Scott, Lord Byron, William Shakespeare) but only a few of them are really buried there.

Not far from the Houses of Parliament is **Buckingham Palace**, the London home of the kings and queens, of Great Britain. It was built in 1703 by the Duke of Buckingham. Outside Buckingham Palace the Changing of the Guard takes place to the accompaniment of the Guard´s bands. The Royal Family occupies the north wing of the Palace and the Royal Standard is flown when the Queen is in residence. An inseparable part of the view of Buckingham Palace is the Queen Victoria Monument in front of it.

The Mall, one of the most exclusive streets with the best-known gentlemen´s clubs and expensive shops, will take the visitors from the Palace through the Admiralty Arch to Trafalgar Square.

Trafalgar Square is said to be the largest in London and is a place of political demonstrations and busy traffic. It originated in the 19th century and its name commemorates the naval victory of Admiral Lord Nelson over the French and Spanish fleet at Spanish Cape Trafalgar in 1805. In the middle of the square is Nelson´s Column (about 50 m high) with a five-meter tall statue of Horatio Nelson at the top. The Column is surrounded by two fountains, several other monuments of famous people, and usually lots of pigeons.

The famous **National Gallery** forms one side of Trafalgar Square. It houses one of the greatest collections of Western painting from the 13th to the 20th centuries. The gallery was opened in1824 but its building was completed in 1838. Next to it is the National Portrait Gallery which houses portraits and photographs of famous people.

A short way from Trafalgar Square along the Haymarket is **Piccadilly Circus** where Regent Street, Piccadilly, the Haymarket and Shaftsbury Avenue join and three underground lines cross under this circular square. This makes it the busiest and noisiest place in London. It also became notable as the centre of entertainment in the West End with its night clubs, theatres, cinemas and restaurants. The most

beautiful view of the square is at night when it is lit by many colourful advertisements. In the centre of the Circus at the top of the Fountain stands Eros, the Greek God of love, built by Lord Shaftsbury, a famous philanthropist.

London is renowned for its wide expanses of parkland and gardens and with its 174km^2 it has an unusually high proportion of greenery. All major parks were once royal gardens. **St. James´s Park** is the oldest of them, one of architect John Nash´s masterpieces. In the 19th century he created a lake with small islands which are the home of many water-birds. The exclusive street The Mall separates the park from St. James´s Palace which became a royal residence in 1699 after the fire had damaged White Hall. Henry VIII had the palace built on the site of a former hospital. It is a typical example of Tudor red-brick architecture.

While St. James´s Park is the oldest, **Hyde Park** is probably the most popular among tourists. The main entrance to Hyde Park is at Hyde Park Corner in the South-East, the busiest London´s crossroads. In the North-East corner of Hyde Park stands the Marble Arch, on the site, formerly called Tyburn, an execution place from the 12th to 18th centuries. But this corner in Hyde Park is best-known for its Speaker´s corner, the place where everybody can speak publicly without fear of being arrested for their opinion. In the west Hyde Park continues with **Kensington Gardens**. Here stands the Albert Memorial which Queen Victoria built in memory of her lamented husband, and Kensington Palace. This was completed in 1605 and later it was redesigned by Christopher Wren. Now it is still a home of the royal family but the State Apartments are open to the public. You can see the former private rooms of Queen Victoria and some other kings and queens. The palace also houses a collection of uniforms and court dresses, including Princess Diana´s wedding dress.

Facing the Albert Memorial in the South is the **Albert Hall**, an immense round concert hall which is capable of seating more than 5000 people. It was designed by Prince Albert, Queen Victoria´s husband and opened in 1871. The famous Promenade concerts (Proms) are held here.

Regent´s Park is perhaps London´s most elegant park with its attractive gardens, lakes and a zoo. The zoo was founded in 1826 and with its 6000 species it belongs to the most comprehensive collections of animals in the world. There are also many other parks in and outside the centre (Green park, Richmond, Holland).

Beside London there are many more places of interest in Britain which are worth seeing, e.g. the white chalk cliffs of Dover and Dover Castle may be the first sights to see when you approach Britain by sea.

TEXT VOCABULARY

To cover-mít rozlohu, pokrýt
Borough-samosprávné město
Treason-vlastizrada
Menagerie-zvěřinec
Distinctive-charakteristický
Nave –hlavní chrámová loď
Column-sloup
To trace-vystopovat
Abbey-opatství
Renowned-významný, slavný
Duke-vévoda
Inseparable-nedílný, neoddělitelný
Square-náměstí
Major-hlavní
Among- mezi
Memorial-památník
Comprehensive-široký, kompexní
Conurbation-městská aglomerace
Enclave –enkláva, oddělené území
To extend-rozšířit
To behead-popravit
Mighty-mocný, silný
To commemorate-připomínat
Seat-sídlo
Strike -úder
Crown-korunovat
Tombstone-náhrobek
To take place-probíhat, konat se
Cape-mys
Expanse-rozloha
Former-bývalý
Marble-mramor
Immense-ohromný
Cliff-útes

Define the following expressions: a seat, mighty, expanse, marble, immense, nave, a memorial

IDEAS FOR DISCUSSION

Have you ever been to London? What did you visit?
Which sight in London would you like to visit? Why?
What part of the text is the most interesting for you? Why?
Describe the history of Westminster Abbey.
When is the view the most beautiful in the Piccadilly Circus square?
Which park in London is the most elegant and which one is the oldest?
Where is St. James Palace built and what type of architecture is it?
Is the name Big Ben the name of the clock? Give an explanation.
Where can you see an arsenal of weapons?

5.1 EXERCISE:

Decide which answer A, B, or C best fits each space.

1) The forest ..... over a large area.

a) extends **b)** expands **c)** contracts

2) .....is the crime of helping your county´s enemies in trying to destroy your country´s government.

a) betrayal **b)** tread **c)** treason

3) James III was .....at Kelso Abbey.

a) crowded **b)** crowned **c)** crowning

4) We offer a .....guide to courses in UK universities.

a) comprehension **b)** limited **c)** comprehensive

5) An/a.....is a large church with buildings connected to it where a group of monks or nuns live or used to live.

a) abbey **b)** abbot **c)** monastery

6) The pressure on students during exam time can be .....

a) big **b)** immense **c)** immensity

7) We want to encourage greater cooperation.....the different departments

a) in front of **b)** among **c)** behind

8) Things that are .....cannot exist or be considered separately

a) inseparable **b)** intimate **c)** separable

5B GRAMMAR - ARTICLES

INDEFINITE article: A, AN

- to indicate one (*a cat*)
- cost, speed, frequency (*40 km an hour, 3x a day, 50p a kilo*)
- a certain number (*a hundred, a thousand, a dozen*)
- when speaking for the first time
- jobs (*a teacher*)

DEFINITE article: THE

- a word is used a second time
- when talking about known objects (*I´ve just washed the car.*)=SPECIFIC
- with musical instruments (*the piano*)
- unique objects (*the moon, the sun*)=ONLY ONE

- ***the** sky, **the** sea, **the** ground, **the** country, **the** environment, **the** capital*
- *go to **the** cinema / theatre, listen to **the** radio*
- CLASSES (***the** giraffe)*
- INVENTIONS (***the** bicycle, **the** telephone*)
- NATIONALITY (***the** French, **the** English*)
- NAMES (***the** Bank of England, **the** Odeon, **the** Holiday Inn*)
- ADJECTIVES (***The** rich should pay higher taxes.*) (***the** poor/young/old*)

GEOGRAPHICAL NAMES

- names of oceans, seas, rivers, deserts
  (***the** Atlantic, **the** Red sea, **the** Amazon, **the** Sahara*)
- countries (***the** Netherlands, **the** USA, **the** Czech Republic*,...)=REPUBLIC, KINGDOM, STATE
- groups of islands (***the** Canaries*)
- mountain ranges (***the** Alps*)
- ***the** north **of** Brazil, **the** University **of** Leads*

ZERO article: 0

- abstract nouns (*love, hate, happiness*)
- materials (*leather*, *iron*, *glass,*.....)
- subjects (*Geography, Physics, Toxicology, History,.....)*
- countries, towns, mountain peaks, islands, continents
- when we speak in general
- *(go to bed / home / work)*
- *(have breakfast / lunch / dinner)*

5.2 EXERCISE:

Mark the correct alternative in each pair.

1) My brother wants to join **--/the** army when he leaves **--/the** school
2) I have **--/a** degree in **--/the** chemistry from **--/the** University of York.
3) Twice **a/the** week, we have **--/a** lecture by **--/the** Professor Hawking.
4) I found some useful information on **--/the** Internet for my project about **--/the** European Union.
5) We couldn´t find any apples at **--/the** supermarket for less than £2 **a/the** kilo.
6) Could you do something for me? Go and pick up Liz from **--/the** airport.

7) If you have **--/the** money and **a/the** good education, you can do almost anything you want.
8) **A/the** computer has changed **--/the** way many people live and work.
9) My little sister is making **--/the** excellent progress at **--/the** school she goes to.
10) In my last year at **--/the** university, I received hardly any advice about careers.

6A REPRODUCTION IN SPIDERS

LEAD IN

How do spiders reproduce?

The typical sarcastic answer to this question is “very carefully!” Comedy and legend aside, spiders are frequently cannibalistic and a female would just as soon eat her mate as reproduce with him. Sometimes she does both. Sometimes the male sacrifices himself. The male redback spider of Australia, *Latrodectus hasselti*, somersaults into the jaws of the female after mating. This might help insure that it is his offspring she produces, rather than another male’s, by providing her with a substantial meal to aid in the development of her eggs. Male spiders usually “approach with caution,” however, literally sending strong signals to identify themselves as members of the same species. Jumping spiders and wolf spiders are well-known for dancing and drumming in specific patterns that leave no doubt as to their intentions. Even tarantulas communicate through rhythmic vibrations. Web-building spiders may enter the web of a female, plucking the threads in a way that differs from the frantic thrashing of an entangled prey item. Once a male spider succeeds in getting close enough, he does something remarkable: he plugs one of his pedipalps into one of the paired genital openings on the underside of the female’s abdomen. He previously secreted sperm from his abdomen onto a small web, then drew up the liquid into each pedipalp. Those modified appendages serve as “intromittent sex organs” that deliver the sperm to a female of the same species. His pedipalp fits so perfectly into the genital opening (epigynum) of his mate that it has been likened to a “lock and key” mating system that prevents cross-breeding between species. Once mating has been accomplished, he may leave part of his pedipalp inside his mate, preventing another male from mating with that female. Males of other species have different tactics to protect their investment of sperm. At least one secretes a kind of cement that seals the female’s genital opening, functioning like a spider chastity belt.

TEXT

Spiders are always dioecious, that is, they invariably have separate sexes. Aside from a few exceptions (for example, *Argyroneta*), the females are larger than the males. This sexual dimorphism is expecially obvious in many tropical orb weavers (such as *Nephila, Gasteracantha,* and *Micrathena*), where the males appear

to be dwarfs. There has been much speculation about the biological meaning of the small body size of male spiders, but so far no consensus has been reached. In any case, the small spider males are very agile, and some can even “fly” on their own thread, just as young spiders do.

Because of their small body size, males need fewer moults to reach maturity than do females; consequently, males mature earlier. After their last moult the males have conspicuously thickened palpal tarsi and can thereby be distinguished easily from the females. The female palps represent simply a kind of shortened leg (without a metatarsus), but the male palps have tarsi that are specialized for the storage and transfer of sperm. This function of the male palps as copulatory organs is highly unusual, and nothing comparable exists in other arthropods.

In contrast to females most male spiders change their habits after their habits last moult. They leave their retreats or webs, and become vagabonds; often they no longer even catch prey. As soon as they have charged their palps with sperm, they are wandering around, searching for a female. Usually they are rather cautious when approaching a female, because they always risk being dealt with as prey. Spiders have therefore developed a special courtship behaviour that generally precedes mating. This courtship is species specific and ensures that hybridization is avoided. The common belief that spider males are eaten by the females during or after copulation is true only for a very few species. In most cases a male either walks away or beats a hasty retreat right after copulation. His palps are then refilled with sperm. This procedure, however, can be repeated only a few times, since most male spiders have rather short lives; many die soon after copulation. Females usually live much longer, since they must still lay eggs and build cocoons. In some species the females also exhibit brood care for the developing young.

Internal sexual organs

The internal sexual organs, the testes and ovaries, lie as paired structures inside the abdomen. The reproductive cells, the sperm and the eggs, are released to the outside in both sexes through a ventral opening (the epigastric furrow) which is situated between and slightly behind the book lungs. The males exude their sperm though this opening onto a special sperm web and the transfer it to their palps. The internal sexual organs are more complex in females, which also have a special storage site for sperm, the seminal receptacles.

External sexual organs

Male spiders lack primary copulatory organs. Instead, their pedipals have been modified to transfer sperm. In many "primitive" spiders (*Orthognatha, Haplogynea* but not *Mesothelae*) the males have only slightly modified pedipalps and the females correspondingly rather simple copulatory organs. On the other hand, in entelegyne spiders a good correlation between the highly differentiated palp of the male and a complex epigynum of the female is evident. The external sexual organs are often so specific to a species that systematicists use them as decisive characters for species identification. It is tempting to postulate that the highly specialized "lock-and-key" mechanism of male and female coplulatory organs severs to prevent cross-breeding between different species. However, we have no experimental proof for this assumption. More likely, hybridization is already inhibited at the behaviour level: courtship is discontinued if one of the spiders does not react in a species-specific way. In fact, many male spiders do try to court females of the "wrong" species; they are, however, usually unsuccessful, because the females are responsive only to males of their own species.

A good example is seen in the courtship of several closely related wolf spiders, so-called *ethospecies*, which differ very little in their morphology but can be distinguished by their behaviour. *Schizocosa ocrata* and *Schizocosa rovneri,* for instance, exhibit almost identical genitalia, yet do not cross-breed under natural conditions, because females accept only conspecific males. However, if the females were briefly anesthetized with carbon dioxide, males of the "wrong" species did mount them and copulated successfully. Such females laid fertile eggs from which hybrid spiderlings developed. Under natural conditions there are further barriers that prevent cross-breeding, e.g. a slightly different habitat of the two species or a seasonal separation of the courtship periods. At any rate, behavioural differences are apparently more important for the isolation of species than genital morphology, as the above experiment clearly shows. It cannot be excluded, however, that interspecific hybridization may occur occasionally in the wild, e.g. in *Tegenaria* species.

Filling the palps

Before a male spider goes in search of a female, he charges his palpal organs with sperm. First he spins a sperm web, which is usually a small triangular structure that is suspended horizontally. The male presses his abdomen against the rim of the triangular web, and moves his abdomen up and down until a drop of sperm

emerges from his genital opening. Thereafter the male moves to the underside of the sperm web and reaches with his palps around the margin of the web. The palps are dipped alternately into the sperm drop. Most likely capillary forces play a role in the uptake of sperm, since the tips of the palps are often “soaked” between the mouth parts before the bulbs are filled. This process is sometimes called “palpal lubrication”.

Sperm can be taken up either directly – as just described – or indirectly, in which case the sperm cells must be sucked through the mesh of the sperm web. Different spider families use different methods of transferring the sperm to the palps. In some species, the sperm web is reduced to a single thread, which is held by the third pair of legs and drawn across the genital opening. The exuded sperm droplet adheres to this thread and is then drawn into the bulb.

For a long time arachnologists thought that “sperm induction” was a precondition for the courting behaviour of the male. In a series of elegant experiments this idea has now been refuted. Male spiders with their palps removed or with a covered genital opening display themselves quite normally toward a female. It is likely that the initiation of courtship is triggered by the central nervous system, probably via hormones, some days after the spider´s last moult. Perhaps this explains why newly moulted males, which have not yet filled their palps with sperm, do not court in the first days following moulting.

Courtship

Courtship can be defined as those ritualized behavioural patterns that are preparatory to mating. It is paramount for male spiders to avoid being mistaken for prey. Furthermore, females, which appear rather passive at first glance, need to be sufficiently stimulated before copulation can take place. Of course, female spiders are not completely passive during courtship. Some female wolf spiders *(Lycosa rabida)*, indicate their willingness to mate by vigorously waving their legs. Even more active is the female *Alopecosa cuneata*: she grasps the male´s front legs (tibiae) with her chelicerae and pulls him slowly towards her; only after slackening of this ritual grip does copulation follow. It is believed that pheromone glands located in the male´s thick tibiae trigger this peculiar behaviour.

Since almost every spider species has developed its own courtship, it is hardly possible to make generally valid statements about this behaviour, but to give at least an outline we shall group the courtship behaviours into these categories or levels. Each level is defined by the mechanism that triggers the male´s courting; level 1

requires direct contact between male and female; level 2 needs female pheromones to stimulate the male´s courtship behaviour, and level 3 postulates a visual recognition of the female by the male.

TEXT VOCABULARY

Orb-kruhový
Agile-pohyblivý
Moult-svlékání
Retreat-úkryt
Mating-páření
To lay-klást
To exude-vypuzovat, vyzařovat
Lack-nedostatek
Tempting-lákavý
Species-specific-druhově-specifický
Conspecific-patřící do stejného druhu
Interspecific-mezidruhový
Rim-okraj
To adhere-zachytit se
To trigger-spouštět
Prey-kořist
Wolf-spider-slíďák
Gland-žláza
Dwarf-trpaslík
Thread-vlákno
Copulatory organs-kopulační orgány
Courtship-námluvy
To refill-doplňovat
Book lungs-plicní vaky
Receptacle-váček
Decisive-určující
Assumption-předpoklad
To court-dvořit se
Spiderlings-potomci, pavoučci
To suspend-zavěsit
Margin-kraj
To refute-vyvrátit
Paramount-nejdůležitější
At first glance-na první pohled
Vigorously-energicky
Outline-nástin

Define the following expressions: dwarf, rim, prey, orb, retreat, vigorously, moult, thread, refill

IDEAS FOR DISCUSSION

Where can and cannot spiders survive?
Describe the differences between a male and a female spider.
Would you keep a spider as a pet? Why or why not?
Describe the process of filling the pulps?
Into what categories or levels are the courtship behaviours divided?
Have you ever seen a tarantula in the wild?

6.1 EXERCISE:

Decide which answer A, B, or C best fits each space.

1) .....is the behaviour of animals who are trying to attract a sexual partner.
   a)courtesy **b)** wedding **c)** courtship
2) Please hand in a/an .....for your next essay by Tuesday.
   a)outlook **b)** outline **c)** form
3) Surrounded by beautiful countryside, it is an ideal rural .....
   a)retreat **b)** retread **c)** retrial
4) A.....is a part of your body that produces a chemical substance that your body needs.
   a)gland **b)** glance **c)** glare
5) A caterpillar is dangling by a silken .....
   a)cotton **b)** thread **c)** threat
6) He held out his cup for a .....
   a)refill **b)** overfill **c)** infill
7) This fungus usually vegetates.....
   a)vigorous **b)** firmly **c)** vigorously
8) If you.....a particular quality, people notice easily that you have a lot of it.
   a)secrete **b)** exult **c)** exude

6B GRAMMAR – GERUND AND INFINITIVE

THE GERUND

- is used like a noun: *(**Smoking** is bad for you.) (Do you like **watching** TV?)*
- is used after preposition: *(Check your passport before **leaving**.)*

INFINITIVE

- after most adjectives: *(I am pleased **to receive** your invitation.)*
- to express purpose: *(I got up early **to do** my homework.)*

VERBS FOLLOWED BY -ING

admit	**enjoy**	**keep**	**stop**	**avoid**	**fancy**	**mind**
suggest	**consider**	**finish**	**postpone**	**deny**	**imagine**	**risk**

(I don´t fancy going out this evening.)

VERBS FOLLOWED BY INFINITIVE

afford	**deserve**	**learn**	**promise**	**agree**	**fail**
manage	**refuse**	**arrange**	**forget**	**offer**	**threaten**
decide	**hope**	**plan**			

(How old were you when you learnt to drive?

VERBS FOLLOWED BY -ING or TO with NO difference in meaning

attempt	**hate**	**propose**	**begin**	**like**
start	**can´t bear**	**love**	**continue**	**prefer**

(She began to eat / eating her meal.)

VERBS FOLLOWED BY -ING or TO with a DIFFERENCE in meaning

stop

*(I stopped **to smoke**.)*.....

*(He has stopped **smoking**.)*.....

try

*(I tried **to keep** my eyes open, but I couldn´t.)*.....

*(The photocopier doesn´t seem to be working. Try **pressing** the green button.)*.....

remember

*(I remember **locking** the door.)*.....

*(Please remember **to post** the letter.)*.....

regret

*(I regret **saying** what I said.)*.....

*(I regret **to inform** you that I cannot offer you the job.)*.....

go on

*(We can´t go on **living** like this.)*.....

*(The president then went on **to talk** about foreign policy.)*.....

6.2 EXCERCISE

Put the verb into gerund or infinitive.

1) .....is really good fun. (fly)
2) We stopped at the motorway services .....something..... (get/eat)
3) I can´t get used to.....before dawn. (get up)
4) I´m sorry about.....you. (not invite)
5) There´s a lot of work.....on the new building. (do)
6) I really love.....with children. (play)
7) .....is a good form of exercise. (swim)
8) There are some very interesting things.....in the British Museum. (see)
9) You´re lucky you haven´t got a child..... (look after)
10) We managed .....the exam by.....each other every evening. (pass/test)

7A SNAKES

LEAD IN

There are about 2,400 species of snakes in the world. They live almost everywhere, in deserts, forests, oceans, streams, and lakes. Some are ground dwellers, others live in trees, and other snakes spend most of their lives in water. There are a few areas where snakes do not live. They cannot survive in places where the ground stays frozen all the year around, so they are missing in the polar regions or at high mountain elevations. Several islands, including Ireland and New Zealand, do not have snakes.

TEXT

Snakes are elongated, legless, carnivorous reptiles of the suborder Serpentes that can be distinguished from lizards by their lack of eyelids and external ears. Snakes are vertebrates. Many species of snakes have skulls with many more joints than their lizard ancestors, enabling them to swallow prey much larger than their heads with their highly mobile jaws. In order to accommodate their narrow bodies, snakes paired organs (such as kidneys) appear one in front of the other instead of side by side, and most have only one functional lung. Some species retain a pelvic girdle with a pair of vestigial claws on either side of the cloaca.

Living snakes are found on every continent except Antarctica and on most islands. Fifteen families are currently recognized comprising 456 genera and over 2,900 species. They range in size from the tiny, 10 cm long thread snake to pythons and anacondas of up to 7.6 metres in length. The recently discovered snake Titanoboa was 15 metres long. Snakes are thought to have evolved from either burrowing or aquatic lizard during the Cretaceous period. The diversity of modern snakes appeared during the Paleocene period.

Most species are non-venomous and those that have venom use it primarily to kill and subdue prey rather than for self-defence. Some possess venom potent enough to cause painful injury or death to humans. Those which are non-venomous either swallow prey alive or kill it via constriction.

The skeleton of most snakes consists solely of the skull, hyoid, vertebral column, and ribs, though some snakes retain vestiges of the pelvis and rear limbs. The skull of the snake consists of a solid and complete braincase, to which many of the other bones are only loosely attached, particularly the highly mobile jaw bones,

which facilitate manipulation and ingestion of large prey items. The left and right sides of the lower jaw are joined only by a flexible ligament. The vertebrae column consists of anywhere between 200-400 (or more)
vertebrae. The vertebrae have projections that allow for strong muscle attachment enabling locomotion without limbs. In some snakes, most notably boas and pythons, there are vestiges of the hind limbs in the form of a pair of pelvic spurs.

Internal organs

The snake´s heart is encased in a sac, called the pericardium. The heart is able to move around, however, owing to the lack of a diaphragm. This adjustment protects the heart from potential damage when large ingested prey is passed through the esophagus. The spleen is attached to the gall bladder and pancreas and filters the blood. The thymus gland is located in fatty tissue above the heart and is responsible for the generation of immune cells in the blood. The cardiovascular system of snakes is also unique for the presence of a renal portal system in which the blood from the snake´s tail passes through the kidneys before returning to the heart.

The vestigial left lung is often small or sometimes even absent, as snakes´ tubular bodies require all of their organs to be long and thin. In the majority of species, only one lung is functional. This lung contains a vascularised anterior portion and a posterior portion which does not function in gas exchange. This lung is used for hydrostatic purposes to adjust buoyancy in some aquatic snakes and its function remains unknown in terrestrial species. Many organs that are paired, such as kidneys or reproductive organs, are staggered within the body, with one located ahead of the other. Snakes have no lymph nodes.

Size

The now extinct Titanoboa cerrejonensis snakes found were 12-15 meters in length. By comparison, the largest extant snake is the reticulated python, which measures about 9 meters long, and the anaconda, which measures about 7.5 meters long and is considered the heaviest snake on Earth. At the other end of the scale, the smallest extant snake is Leptotyphlops carlae with a length of about 10 centimeters.

Skin

The skin of a snake is covered in scales. Contrary to the popular notion of snakes being slimy because of possible confusion of snakes with worms, snake skin has a smooth, dry texture. The body scales may be smooth, or granular. The eyelids of a snake are transparent and remain permanently closed. The shape and number of

scales on the head, back, and belly are often characteristic and used for taxonomic purposes.

Perception

Eyesight

Snake vision varies greatly, from only being able to distinguish light from dark to keen eyesight, but the main trend is that their vision is adequate although not sharp, and allows them to track movements. Generally, vision is best in arboreal snakes and weakest in burrowing snakes. Some snakes, such as the Asian vine snake (genus Ahaetulla), have binocular vision, with both eyes capable of focusing on the same point.

Smell

Snakes use smell to track their prey. It smells by using its forked tongue to collect airborne particles then passing them to the Jacobson´s organ or the Vomeronasal organ in the mouth for examination. The fork in the tongue gives the snake a sort of directional sense of smell and taste simultaneously. The snake keeps its tongue constantly in motion, sampling particles from the air, ground, and water analyzing the chemicals found and determining the presence of prey or predators in its local environment.

Vibration sensitivity

The part of the body which is in direct contact with the surface of the ground is very sensitive to vibration, thus a snake is able to sense other animals approaching through detecting faint vibrations in the air and on the ground.

Infrared sensitivity

Vipers, pythons, and some boas have infrared-sensitive receptors in deep groves between the nostril and eye, which allow them to “see” the radiated heat, infrared sensitivity helps snakes locate nearby prey, especially warm-blooded mammals.

Snake venom

Cobras, vipers, and closely related species use venom to immobilize or kill their prey. The venom is modified saliva, delivered through fangs. The fangs of venomous snakes, like viperids, are hollow in order to inject venom more effectively, while the fangs of snakes such as the Boomslang merely have a groove on the posterior edge to channel venom into the wound. Snake venoms are often prey specific, its role in self-defence is secondary. Venomous snakes include three families of snakes and do not constitute a formal classification group used in taxonomy.

Snakes venoms are complex mixtures of proteins and are stored in poison glands at the back of the head. In all venomous snakes these glands open through ducts into grooved or hollow teeth in the upper jaw. These proteins can potentially be a mix of neurotoxins (which attack the nervous system), hemotoxins (which attack the circulatory system), cytotoxins, bungarotoxins and many other toxins that effect the body in different ways. Almost all snake venom contains hyaluronidase, an enzyme that ensures rapid diffusion of the venom.

Venomous snakes that use hemotoxins usually have the fangs that secrete the venom in the front of their mouths, making it easier for them to inject the venom into their victims. Some snakes that use neurotoxins, have their fangs located in the back of their mouths, with the fangs curled backwards. Cobras and kraits possessing hollow fangs which cannot be erected toward the front of their mouths and cannot "stab" like a viper, must actually bite the victim.

It has recently been suggested that all snakes may be venomous to a certain degree, with harmless snakes having weak venom and no fangs. Most snakes currently labelled "non-venomous" would still be considered harmless according to this theory, as these snakes either lack a delivery method for the venom or are simply incapable of delivering enough to endanger a human.

Venomous snakes are classified in two taxonomic families:

- Elapids-cobras including king cobras, kraits, mambas, sea snakes, and coral snakes
- Viperids-vipers or rattlesnakes

There is a third family containing the opistoglyphous snakes:

- Colubrids-tree snakes, vine snakes, mangrove snakes, although not all colubrids are venomous.

TEXT VOCABULARY

Carnivorous-masožravý
Jaw-čelist
Pythons-krajta
Non-venomous-nejedovatý
Venom-jed
Hyoid-jazylka
Pelvis-pánev
Vertebrates-obratlovci
Genera-rod
Diversity-rozmanitost
Pray-kořist
To swallow-polykat
Ribs-žebra
Loosely-volně

Flexible ligament-pružný vaz
Enabling-umožňující
Sac-vak
Spleen-slezina
Renal-ledvinový
Anterior-přední
Aquatic-vodní
Extant-žijící
To track-sledovat
Forked-vidlicovitý
Thus-tedy, tudíž
Mammals-savci
Saliva-slina
Diffusion-šíření
Harmless-neškodný

Vertebrae-obratle
Boa-hroznýš
Owing to-vzhledem k
Fatty tissue-tuková tkáň
Vestigial-zbytkový
To adjust-upravit
Within-v, po
Texture-stavba, struktura
Arboreal-žijící na stromech
In motion-v pohybu
Groves-drážky
To immobilize-znehybnit
Poison glands-jedové žlázy
To a certain degree-v určitém stupni
Incapable of-neschopný čeho

Give a definition of the following expressions: carnivorous, mammals, venom, in motion, aquatic, arboreal, ribs, loosely

IDEAS FOR DISCUSSION

Where can and cannot snakes survive?
What is snakes infrared sensitivity used for?
How do snakes use smell to track their pray?
Would you keep a snake as a pet? Why or why not?
Describe the skeleton of snakes.
Have you ever seen a snake in the wild?

7.1 EXERCISE:

Decide which answer A, B, or C best fits each space.

1) His ..... dropped in surprise.
a)tongue **b)** jaw **c)** tooth.
2) Snakes are .....
a)vertebrates **b)** chordates **c)** invertebrates
3) The material is ..... made even more resilient.
a)thus **b)** like **c)** whereas

4) The method should be ..... to animals.

a)innocent **b)** dangerous **c)** harmless

5) The lion is a.....animal.

a)herbivorous **b)** carnivorous **c)** vegetarian

6) ..... belong to a viperid taxonomic family.

a)cobras **b)** tree snakes **c)** rattlesnakes

7) The skin of a snake is covered in.....

a)scales **b)** fur **c)** flakes

8)The jumper stretched. It is ..... knit.

a)tightly **b)** loosely **c)** freely

7B GRAMMAR - THE PASSIVE VOICE

- the passive is used to describe actions - when we don´t know who does, or did the action, when it is not important to know who does, or did the action.

PRESENT SIMPLE

noun / pronoun + to be + past participle

*(The terrarium **is washed** every week. Rattlesnake**s are not seen** in the polar regions.)*

PAST SIMPLE

*(The viper **was handled** with vigilance. The children **were taught** to be careful when they see a snake.)*

PRESENT PERFECT SIMPLE

*(The party **has been ended**. They **have been told** to wait.)*

FUTURE

(*Income tax **will be increased** next year.)*

7.2 EXERCISE:

Rewrite these sentences in the passive. Begin with the word given. Be careful with word order.

1) We kindly request passengers to keep their seat belts fastened during take-off.

   Passengers .....

2) We have banned smoking on all flights, in accordance with recent regulations.

Smoking .....

3) You must put hand luggage under your seat or in the compartment above the seat.
   Hand .....
4) You can obtain information about the flight from the personnel on board.
   Information .....
5) We trained all our flight assistants to deal with emergency situations.
   All .....
6) We will make every effort to ensure that passengers have a pleasant trip.
   Every .....

7.3 QUIZ

1)What is a reptile?

A) An animal that does not lay eggs.

B) A bird that lays eggs.

C) An animal with scales that lays eggs.

2)If you are bitten by a poisonous snake you need to be injected with a _____ to help you recover.

A) vaccine

B) serum

C) tablet

3)Where do rattlesnakes like to live?

A) In open spaces.

B) In small, dark spaces.

C) In trees.

4)If you are given a vaccine, should it.....

A) make you feel very ill?

B) make you feel very healthy?

C) protect you against a particular disease?

8A TOXINS IN HERBS AND PLANTS

LEAD IN

"Only the dose determines whether a substance is or is not a poison". Said Paracelsus, a famous alchemist and doctor. A lot of plants can be used in medicine, but every substance can be abused. The best-known toxins are animal toxins, toxins found in fungi and plants. The using of plants dominated in Europe in the antique era, the middle Ages and the Renaissance and in China. The Borgia family was well known because of a poisoning in Italy. The using of herbs is connected with witchcraft. Everybody, who understood the power of herbs, was a "witch" or a "wizard". "Witches" picked mainly Mandragora officinarum, Atropa belladonna and Hyosciamus niger and preserved them in oils and fats to unfasten tropan alkaloids. These alkaloids and glycosides are predominant substances in herbals and plants. Nowadays we have faith in synthetic substances, but every synthesis needs natural substance. Every day we are confronted with poisons, which are in medications or in food, for example in potatoes.

TEXT

Alkaloids are organic compounds with nitrogen. They consist of chinolizidine alkaloids, piperidine and pyridine alkaloids (coniine, nicotine, and tropan alkaloids), isoquinoline alkaloids (morphine), indol alkaloids, and terpenic alkaloids (aconitine). Glycosides are composed of glycon, aglycon and glycosidic bond. Glycon is the sugar part and aglycon is the non-sugar part. Other poisons are for example acids, amino acids, terpenes or saponines. There are a lot of different kinds of toxins in plants, therefore we have a lot of ways to heal people, who are intoxicated with these toxins. The first aid is the evocation of vomiting. We know 13 well-known and extremely poisonous plants.

Aconitum napellus

The other names are "Wolf´s bane", "Monkshood" or "Monk´s blood". It can grow to 50-150 centimetres, its leaves are rounded, the flower is 1-3 centimetres tall and it has a dark blue colour. It blossoms from June to October. This herb is very divers, it has more than 200 species and 9 of them grow in Europe. We can find it in Western Europe, in the Alps, in the Balkan Peninsula and in the Carpathian Mountains. It grows in meadows, pastures, hillsides, in damp forests, in symbiosis

with alder-trees, near streams, in detritus and in places, where people use nitrogen fertilizers. It was spread into the eastern parts of North America. It does not grow in the Czech Republic. A Lethal dose for an adult person is 3-4 mg. The maximum poison is in its bulbs and leaves. It was used by people in prehistoric times on spears and arrows for hunting or in battles and as a remedy for fever in Chinese medicine.

It has negative effects on the cardiovascular and the central nervous system. The first symptoms of poisoning appear after a few minutes following application. A person can die of intoxication in an hour. The patient is aggressive, has fever, diarrhoea, cold fever and a fear of death. He has a prickly sensation in his mouth, on his face, on his ears and on the entire head, in his fingers, in the pelvis, the back and the breast. He becomes insensitive to it in the end, he has shallow breathing and he dies of apnoea and heart blockage. The patient doesn´t lose consciousness. It is abused as a drug, because it is hallucinogenic. He can have visual, auditory and olfactory hallucinations, which are very intensive. He wants to move, fly, ride or spin around and he laughs without reason.

Convallaria majalis

The other name is “Lily of the valley”, “May lily” or “May bells”. In Christianity it is called “Mary´s tears”. It is a symbol for the tears of Jesus´s mother, when she cried at the crucifixion of Jesus Christ. It can be Eve´s tears after she was expelled with Adam from the Garden of Eden, too. It is a symbol of humility in religious paintings. “Majalis” means “belonging to May”. In the “language of flowers” it signifies the return of happiness. In 1967 it became the national flower of Finland.

It is 10-30 centimetres tall and has two leaves, which are 20 centimetres long. The flowers are white and bell-shaped. Some species can have pink flowers. It blossoms from May to June. From 2-6 berries are the fruit fromed this plant. It has this fruit from July to August. Often it is form in extensive colonies with perhaps 15 subjects. These plants grow in the whole of Europe, in Asia, Japan and in North America. It flourishes in light forests, bushes, meadows, lowlands, but mountains too. It prefers acidic soils and it is popular as a garden plant.

The poison is present in all parts of the plant. The poison is in the water of a vase, into which it was placed. The poison does not accumulate in the human body. It contains glycosides, for example convallatowin, saponines and essential oils. The fresh flowers are the most poisonous. There is 3-4g of convallatoxin in 1 kg of this flower. It is 0,005g in leaves. 1-5fruits is a dangerous dosage. Conallatoxin is soluble

in water. Intoxication has negative effects on the digestive system. The patient suffers from emesis, diarrhoea, urination, staggering, spasm and heart and cardiovascular problems such as arrhythmia. It is used as a remedy for heartburn, heart diseases and epilepsy. The flowers are soluble in acetic acid and wine. This liquid is a remedy for headache and it slows down the heart beat. A patient can use this for a long time.

Chelidonium majus

The Latin name of this plant is “Coeli donum” and it means “A gift from heaven”, because it can be used as a remedy. It is called “vlaštovičník” in Czech, because it blossoms at the time, when the swallows return to the Czech Republic from the tropics. It is called “great celandine” or “tetterwort” in English. It is a perennial herb. It is 30-70 centimetres tall with an orange milk. Leaves are deeply divided and 30 centimetres long. The flowers are 1centimetre long and this herb blossoms from May to Autumn. The seeds are small and black and attract ants. It grows in Europe, Scandinavia and North America, where it was brought by settlers as an herbal remedy for skin problems in 1672. It grows near houses, in parks, by walls and hedges and near bushes. We can find it at the edge of roads, forests and in damp soil. The root and the green parts of the herbal are toxic. The most toxic is the root. There are 20 different isoquinoline alkaloids in its milk, for example chelidonine, homochelidonine, berberine or sparteine. It can be used for coloration of textures or wool and as a drug.

It can be taken orally or injected. People can bathe in its leaves. It dampens the central nervous system. Muscular convulsions become less severe after application. It is anaesthetic, cytostatic and narcotic. It stimulates the immune system. When someone receives a bigger dose, he can have cramps, it stimulates breathing and the moving of the intestines. The patient salivates and vomits. He can become paralysed and he can die. A lethal dose is only 18mg per kg. When someone drinks the milk, he can have blisters, irritation on the neck and skin, bloody diarrhoea or urine. It contains yellow sap, which cannot be washed down easily. It is antibacterial, so it is used as a remedy for warts and freckles, problems with gall bladder, stomach and intestinal problems.

There are other poisonous herbs, for example: Digitalis purpurea, Mandragora officinarum, Ricinus communis, Conium maculatum, Datura stramonium, Atropa belladonna, Hyosciamus niger, Artemisia absinthium,.....

TEXT VOCABULARY

Dose-dávka
Poison-jed
Substance-látka
To consist of-skládat se z
To blossom-kvést
Meadow-louka
Lethal-smrtelný
Shallow-povrchní
Olfactory-čichový
Humility-pokora
Acidic-kyselý
Soluble-rozpustný
Perennial-trvalka
Skin-kožní
Damp-vlhký
Root-kořen
Intestines-střevo
Blister-puchýř

To determine-určovat
Witchcraft-čarodějnictví
Compound-sloučenina/směs
To heal-léčit/zahojit
Rounded-kulatý
Alder tree-olše
Remedy-lék
Consciousness-vědomí
Lilly of the valley-konvalinka
Extensive-rozsáhlý
To accumulate-nahromadit
Celandine-vlaštovičník větší
Seed-semeno
Hedge-živý plot
Soil-půda
Convulsion-křeč
To salivate-slintat
Wart-bradavice

Define the following expressions: root, remedy, poison, meadow, shallow, extensive, to bloom, consciousness

IDEAS FOR DISCUSSION

What was the using of herbals connected with?
What are alkaloids?
Where and why were herbs preserved?
What are the other names of Convallaria majalis?
Where can we find poison?
Which glycoside contains sugar?
When does the “Monk´s blood” blossom and where you can find it?
What are the symptom of celandine poisoning?
Describe the flower “Lily of the valley”.

8.1 EXERCISE:

Decide which answer A, B, or C best fits each space.

1) We crawled through a gap in the .....
   a)hedgehog **b)**hedge **c)** hadge
2) His feet were all .....
   a)blistering **b)**blisters **c)** block
3) It´s very dangerous and able to kill you.
   a)lethal **b)** letdown **c)** leathal
4) A tree that grows near water and has round leaves and long thin yellow flowers called catkins
   a)poplar **b)** maple **c)** alder
5) .....means continuing to exist, especially for longer than you would like
   a)persistency **b)** persist **c)** persistent
6) An amount of a drug that has been measured so that you can take it.
   a)dose **b)** overdose **c)** dosage
7) The part of a plant that grows under the ground, through which the plant gets water and food.
   a) leave **b)** root **c)** seed
8) Add more sugar if it tastes too .....
   a)sweet **b)** sarcastic **c)** acidic

8B GRAMMAR - PAST TENSES

PAST SIMPLE

- is used to describe finished events in the past
  (I went into the station and bought a ticket.)
- telling a story
- *(It´s high time I went home.)*

PAST CONTINUOUS

- in the middle of an action *(They were playing tennis.)*
- two actions at the same time *(I was cooking while he was sleeping.)*
- interrupted event *(When I was walking down the street I suddenly saw him.)*

PAST PERFECT SIMPLE

- a past event which took place before another past event
  (When we arrived at the bus stop, the bus had already left.)

PAST PERFECT CONTINUOUS

- how long an action lasted
  (The telephone had been ringing for 3 minutes.)

HABITS IN THE PAST

USED TO

- to describe a past habit *(I used to get up at six, but now I get up at eight.)*

WOULD

- a person´s typical activities in the past *(Every evening Jack would turn on the radio and fall asleep.)*

8.2 EXERCISE

Decide which answer A, B, C or D best fits each space.

1) It.....raining for a while, but now it´s raining again.
   a) stopped **b)** has stopped **c)** was stopped
2) My mother..... in Scotland.
   a) grew up **b)** has grown up **c)** had grown up
3) .....a lot of sweets when you were a child?
   a) Have you eaten **b)** Had you eaten **c)** did you eat
4) Ian..... in Scotland for ten years. Now he lives in London.
   a) lived **b)** has lived **c)** has been living
5) The man sitting next to me on the plane was very nervous. He .....before.
   a) hasn´t flown **b)** didn´t fly **c)** hadn´t flown
6) Cathy was sitting in an armchair resting. She was tired because.....very hard.
   a) she was working **b)** she´s been working **c)** she´d been working.
7) .....a car when you were living in London?
   a) Had you **b)** Were you having **c)** Did you have
8) I.....tennis a lot, but I don´t play very often now.
   a) was playing **b)** was used to play **c)** used to play

KEY TO EXERCISES:

1.1

1)A 2)C 3)B 4)C 5)B 6)A 7)C 8)A

1.2

1)C 2)D 3)A 4)D 5)B 6)B 7)D 8)D

2.1

1)B 2)C 3)A 4)A 5)C 6)B 7)A 8)C

2.2

1)I´ll have 2) Are you going 3) shall I phone 4) It´s going to land 5) it is 6) I´m going....is getting 7) I´ll tell .....I´m .....I won´t be 8) we´ll be living

3.1

1)C 2)C 3)B 4)A 5)C 6)A 7)B 8)A

3.2

1)Where have you been? 2) Do you sell postcards? 3) Who does this calculator belong to? 4) How long are you staying here? 5) What is your new office like? 6) Which of the flights are full? 7) What time does the carnival start? 8) What holiday has Nancy decided on?

4.1

1)B 2)A 3)C 4)C 5)B 6)B 7)A 8) C

4.2

1) found 2) ´m not 3) had known 4) rings 5) were 6) had 7) hadn´t had
8) had driven/had been driving

5.1

1)A 2)C 3)B 4)C 5)A 6)B 7) B 8)A

5.2

1)the, -- 2) a, --, the 3) a, a, -- 4) the, the 5) the, a 6)the 7) the, a 8) the, the
9) --, the 10) --

6.1

1)C 2)B 3)A 4)A 5)B 6)A 7)C 8)C

6.2

1)Flying 2) to get/to eat 3) getting up 4) not inviting 5) to do 6) playing 7) swimming 8) to see 9) to look after 10) to pass /testing

7.1

1)B 2)A 3)A 4)C 5)B 6)C 7)A 8)B

7.2

1)....are kindly requested to keep.....

2)....has been banned on all flights in accordance.....

3)....luggage must be put under your seat or.....

4)....about the flight can be obtained from the personnel.....

5)....our flight assistants were trained to deal with.....

6)....effort will be made by our staff to ensure that.....

7.3

1)C 2)B 3)A 4)C

8.1

1)B 2)B 3)A 4)C 5)C 6)A 7)B 8)C

8.2

1)A 2)A 3)C 4)A 5)C 6)C 7)C 8)C

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