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## ИНОСТРАННЫЙ ЯЗЫК

Методическое пособие для аудиторных занятий и самостоятельной работы  
студентов очной и заочной форм обучения



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Учебное пособие представляет собой рекомендации студентам очной и заочной форм по организации самостоятельной работы для достижения практического владения языком, позволяющего использовать его в академической и технической сфере.

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## ПРЕДИСЛОВИЕ

Настоящее учебное пособие предназначено для студентов сельскохозяйственных вузов, обучающихся по направлению подготовки бакалавриата «Технология производства и переработки сельскохозяйственной продукции».

**Целью** данного пособия является подготовка студентов к использованию английского языка в их будущей профессиональной деятельности, развитие у них разнообразных практических умений и навыков, таких как чтение и говорение на английском языке в сфере профессионально-ориентированного общения. Содержание пособия способствует формированию иноязычной (универсальной) компетенции - **«способность осуществлять деловую коммуникацию в устной и письменной формах на государственном языке Российской Федерации и иностранном языке»**. Отобранный текстовый материал по своему содержанию, объему и характеру доступен для студентов и интересен в информационном плане, что благоприятствует созданию положительной мотивации на занятиях, дает стимул к самостоятельной работе над языком, а также является обязательным условием формирования профессионально-ценностного отношения студентов сельскохозяйственного вуза к изучению иностранного языка. Тексты аутентичны, в них представлена терминологическая лексика, необходимая для формирования навыка чтения специальной литературы.

**Структура учебного пособия.** Пособие состоит из пяти частей: Первые две части (*Types of Meat u Milk*) содержат разнообразные тексты о процессах производства и переработки мясомолочных продуктов, а также интересные факты об истории происхождения этих продуктов и их питательной ценности. В конце каждого текста предлагаются упражнения и задания в основном лексической направленности. Эти задания можно расширить, предложив студентам выполнить ряд традиционных упражнений по работе с текстом (аннотирование, выделение ключевых предложений, составление вопросов для дискуссии на занятиях и т.п.).

Третья и четвертая части (*Food and Health* и *Food Technology*) направлены на формирование любви и интереса к будущей профессии, коммуникативно-компетентной личности специалиста. При отборе текстового материала в качестве основного критерия служила информативная ценность текстов и их соответствие профессиональным интересам студентов. Для снятия лексических трудностей при работе с некоторыми текстами приводится англо-русский словарь профессиональных терминов.

Система грамматического материала и упражнений вынесена в отдельную, пятую часть пособия (*Grammar Revision*) и содержит основной грамматический материал, изучаемый в неязыковых вузах. Весь материал построен на основе специальной лексики и может прорабатываться во время занятий или быть предложен в качестве домашнего задания. В конце раздела предлагаются лексико-грамматические упражнения и тесты разного уровня.



## **PART I**

### **TYPES OF MEAT**

Meat is the common term used to describe the flesh or other edible parts of animals (usually domesticated cattle, swine, and sheep) used for food, including not only the muscles and fat but also

the tendons and ligaments. Processed or manufactured products prepared from animal tissues are also called meat.

Containing all the amino acids necessary for the human body, meat is valued as a complete protein food. The fat of meat, which varies widely with the species, quality, and cut, is a valuable source of energy and also influences the flavour, juiciness, and tenderness of the lean. Parts such as livers, kidneys, hearts, and other portions are excellent sources of vitamins and of essential minerals, easily assimilated by the human system.

Meat digests somewhat slowly, but 95 percent of meat protein and 96 percent of the fat are digested. Fats tend to retard the digestion of other foods; thus, the higher the proportion of fat the longer meat remain in the stomach, delaying hunger and giving —staying power. Extractives in meat cause a flow of saliva and gastric juices, creating the desire to eat and ensuring ease of digestion.

Meats are often classified by the type of animal from which they are taken. Red meat refers to the meat taken from mammals; white meat refers to the meat taken from fowl; seafood refers to the meat taken from fish and shellfish; and game refers to meat taken from animals that are not commonly domesticated. In addition, most commonly consumed meats are specifically identified by the live animal from which they come. The most widely consumed meat is beef, the flesh of mature cattle that normally weigh from 450 to 540 kg and yield between 55 and 60 percent of their weight in meat. Veal, the flesh of calves of cattle, is much less fatty than beef.

The pig is believed to be the world's second largest provider of meat known as pork. When taken to slaughter, pigs generally weigh between 90 and 135 kg and provide about 70 to 74 percent of that weight in meat.

Meat from lambs and sheep is produced on a much smaller scale than either beef or pork (less than one-tenth of that provided by cattle, for example). They ordinarily weigh between 45 and 70 kg, although the most select lambs may weigh no more than 14 to 18 kg and yield about 48 to 50 percent of their weight in meat.

The meat-products industry, though called meat packing, includes the slaughtering of animals. The steps in this process generally include stunning, bleeding, eviscerating, and skinning. Carcasses are then inspected and graded according to government-set standards of quality.

The usual methods of preserving meat from bacteria and decay are refrigerating, freezing, curing, freeze-drying, and canning.

**Protein.** Meat is an excellent source of proteins which carry out specific functions in living muscle tissue and in the conversion of muscle to meat. They include actin and myosin (myofibrillar proteins), glycolytic enzymes and myoglobin (sarco-plasmic proteins), and collagen (connective tissue proteins). Because the proteins found in meat provide all nine essential amino acids to the diet, meat is considered to be a complete source of protein.

In the diet the fats found in meat act as carriers for the fat-soluble vitamins (A, D, E, and K) and supply essential fatty acids (fatty acids not supplied by the body). In addition to their role as an energy reserve, fatty acids are precursors in the synthesis of phospholipids, the main structural molecules of all biological membranes.

Fatty acids are classified as being either saturated (lacking double bonds between their carbon atoms), monounsaturated (with one double bond), or polyunsaturated (containing several double bonds). The fatty acid composition of meats is dependent on several factors. In animals with simple stomachs, called non ruminants (e.g., pigs), diet can significantly alter the fatty acid composition of meat. If non ruminants are fed diets high in unsaturated fats, the fat they deposit in their muscles



raises levels of unsaturated fatty acids. In animals with multichambered stomachs, called ruminants (e.g., cattle and sheep), fatty acid composition found in the lean muscle is relatively unaffected by diet because microorganisms in the stomach alter the chemical composition of the fatty acids before they leave the digestive tract.

**Vitamins and minerals.** Meat contains a number of essential vitamins and minerals. It is an excellent source of many of the B vitamins, including thiamine, choline, B 6, niacin, and folic acid. Some types of meat, especially liver, also contain vitamins A, D, E, and K.

Meat is an excellent source of the minerals iron, zinc, and phosphorus, a number of essential trace minerals, such as copper, molybdenum, nickel, selenium, chromium, and fluorine having been found in meat as well.

**Water.** Water is the most abundant component of meat. However, because adipose tissue contains little or no moisture, as the percentage of fat increases in a meat cut, the percentage of water declines. Therefore, lean young veal may be as much as 80 percent water, while fully fattened beef may be as little as 50 percent. Because water is lost when meats are cooked, the percentages of protein and fat in cooked meats are usually higher than in the raw counterparts.

### **I. Translate into English:**

1. Мясо - это общий термин, используемый для описания мяса или других съедобных частей животных, используемых в пищу.

2. Так как мясо содержит все аминокислоты, необходимые для организма человека, оно ценится как полноценная белковая пища.

3. Экстрактивные вещества в мясе вызывают приток слюны и желудочного сока, создавая желание есть и обеспечивая легкость пищеварения.

4. Мясо часто классифицируется по типу животного, у которого оно взято.

5. Считается, что свинья является вторым в мире поставщиком мяса, известного как свинина.

6. Мясо ягнят и овец производится в гораздо меньших масштабах, чем говядина или свинина.

## **II. Ask questions about the words in italics:**

1. *Meat* is the common term used to describe the flesh or other edible parts of animals used for food.
2. Meat is valued as *a complete protein food*.
3. The fat of meat is a *valuable* source of energy.
4. Meat digests somewhat *slowly*.
5. Extractives in meat *cause a flow of saliva and gastric juices*.
6. Meats are often classified *by the type of animal* from which they are taken.

## **III. Translate the following words into Russian:**

amino acids, flavor, juiciness, tenderness, digestion, mature cattle, veal, pork, beef, slaughtering of animals, canning, fat-soluble vitamins, non-ruminants animals, cattle, liver, kidneys, animal tissues

## **PRESERVATION AND STORAGE**

Meat preservation helps to control spoilage by inhibiting the growth of microorganisms, slowing enzymatic activity, and preventing the oxidation of fatty acids that promote rancidity. There are many factors affecting the length of time meat products can be stored while maintaining product safety and quality. The physical state of meat plays a role in the number of micro organisms that can grow on meat. For example, grinding meat increases the surface area, releases moisture and nutrients from the muscle fibres, and distributes surface microorganisms throughout the meat. Chemical properties of meat, such as pH and moisture content, affect the ability of microorganisms to grow on meat.

## **BEEF**

Beef is flesh of mature cattle, as distinguished from veal, i.e. the flesh of calves. The best beef is obtained from early maturing, special beef breeds. High-quality beef has firm, velvety, fine-grained lean, bright red in colour and well-marbled, the fat being smooth, creamy white, and well distributed. In young beef the bones are soft, porous, and red; the less desirable mature beef has hard white bones. Beef tenderness and flavour are improved by ageing; in one common ageing method the carcass is hung for about two weeks at approximately 2° C, encouraging physical changes in the muscle tissue that enhance the quality of the meat.

Grading standards are somewhat similar in various countries, as there is a large international beef trade. In the United States, grades in order of quality are prime, choice, good, commercial, utility, cutter, and canner. Commercial grades are mainly from mature cattle, especially cows. Utility, cutter, and canner grades are used in processed meat products. Beef hide, used for leather manufacture, is a valuable byproduct of beef.

### **I. Choose the proper words from those given in brackets and translate the sentences:**

1. Beef is flesh of mature (sheep, pigs, cattle).
2. Veal is flesh of (lambs, calves, piglets).
3. There is a (large, small, enormous) international beef trade.
4. Beef hide is a valuable byproduct of beef for manufacture (tissue, fiber, leather).

### **II. Give the English equivalents to the following Russian words:**

говядина, телятина, консервация, хранение, жирные кислоты, безопасность и качество продукта, влиять, мясные породы, изготовление кожи, постное мясо, кости, пористый, мышечная ткань, торговля, созревание

## HAMBURGER



Hamburger is also called burger, or ground beef. The term is applied variously to a patty of ground beef, sometimes called hamburger steak, Salisbury steak, or Vienna steak, a sandwich consisting of a patty of beef served within a split bread roll, with various garnishes, or the ground beef itself, which is used as a base in many sauces, and other dishes.

The importance of the hamburger in the 20th-century American culture is indicated by its virtually universal use at backyard barbecues as well as its availability at various types of cafes, the so-called hamburger stands and fast-food restaurants, the best known chains being McDonald's, Burger King, and Wendy's.

Hamburgers are usually eaten as a sandwich, between two halves of a round bun. Mustard, mayonnaise, ketchup, and other condiments, along with garnishes of lettuce, onion, tomato, and cucumber are the most commonly used dressings. In the variation known as the cheeseburger, a slice of cheese is melted over the patty. The patty itself is often seasoned with chopped onions, spices, or bread crumbs before cooking.

### **I. Agree or disagree with the following statements using the information from the text:**

1. Hamburger is also called ground beef.
2. The importance of the hamburger in the 20th-century American culture is indicated by its availability at Michelin restaurants.
3. The best known chains of fast-food restaurants are McDonald's, Burger King and Wendy's.
4. Mustard, mayonnaise, jam and ketchup are the most commonly used condiments.
5. In the variation known as the cheeseburger, a slice of cheese is grated over the patty.

6. Hamburgers are usually eaten as porridge.

## II. What do you think – is eating hamburgers useful for your health?

Why?

### VEAL



Veal is meat of calves slaughtered between 3 and 14 weeks, delicate in flavour, pale grayish white in colour, firm and fine-grained, with velvety texture. It has no marbling, and the small amount of fat covering is firm and white. In modern livestock farming, calves bred to yield high-quality veal

are raised indoors under controlled temperatures 16°— 18°C and intensively fed on milk, high-protein calf meal, or both. Grasses are excluded, resulting in an iron deficiency producing the desirable light colour in the meat. Although the meat of an animal from 15 weeks to one year is technically called calf, it is frequently marketed as veal.

Wholesale cuts, usually smaller than comparable beef cuts, vary in different countries. Because of its high amount of connective tissue and low fat content, large cuts of veal require long, slow cooking. Fat in the form of lard or salt pork may be added to avoid dryness. Veal is often served rare in European countries but is usually thoroughly cooked in the U.S. Cuts such as the leg, loin, shoulder, and breast are usually roasted, often boned and stuffed, or braised. Schnitzel, pan-fried cutlets coated with bread crumbs, are a specialty of Germany and Austria. Scallops, small thin slices — called *scallopine* in Italy and *escalopes* or *medallions* in France — may be cooked in wine or other sauces.

## **I. Fill in the blanks with the required words:**

1. Veal is meat of calves slaughtered ... 3 and 14 weeks .
2. In modern livestock farming, calves are intensively fed on ... .
3. Grasses are excluded, resulting in ... .. producing the desirable light colour in the meat.
4. Schnitzel, pan-fried cutlets coated with ..., are a specialty of Germany and Austria.
- 5.... may be cooked in wine or other sauces.

## **II. Retell the text.**

### **PORK**

Pork is flesh of hogs, usually slaughtered between the ages of six months and one year. The most desirable pork is grayish pink in colour, firm and finegrained, well-marbled, and covered with an outer layer of firm white fat. About 30 percent of the meat is consumed as cooked fresh



meat; the remainder is cured or smoked for bacon and ham, used in sausage, and used to produce lard. Because pigs may be infected by the parasitic disease trichinosis, pork must be cooked to an internal temperature of 71°C in order to destroy the disease-causing organism.

Pork is one of the most popular types of meats and is consumed around the world. However, it is prohibited by the dietary laws of Judaism and Islam, so pork is virtually unknown in the cuisines of the Middle East and those of some local populations in Asia and Africa. The chief pork-consuming countries (on a per capita basis) are Germany, Denmark, Poland, and Austria.

In Western cooking fresh pork is commonly roasted, choice cuts being the loin, leg, and rib sections known as spareribs. Chops from the loin and ribs are usually

grilled or pan-fried. A spin-roasted whole young piglet, or suckling pig, is a delicacy in central and eastern Europe; wild pigs have traditionally been cooked in a similar manner throughout the Pacific. Less desirable parts — ears, tail, hocks, feet, brains — and the fatty portions of the back of the carcass (fatback), may be cooked with various greens, especially in the southern United States.

In China and Southeast Asia, pork is commonly shredded and fried with vegetables and spices. Pork-and-vegetable mixtures are also used to stuff a variety of small rolls, buns or dumplings.

**I. Give the appropriate questions to the following answers:**

1. Between the ages of six months and one year.
2. About 30 percent of the meat.
3. In order to destroy the disease-causing organism.
4. By the dietary laws of Judaism and Islam.
5. Germany, Denmark, Poland, and Austria

**LAMB**



Lamb is a sheep before the age of one year, and the flesh of such animals. Mutton refers to the flesh of the mature ram or ewe at least one year old; the meat of sheep between 12 and 20 months old may be called yearling mutton. The meat of sheep 6 to 10 weeks old is usually sold as baby lamb, and spring lamb is from sheep of five to six months.

The mild flavour of lamb is preferred in most Western countries; the stronger flavour of mutton being desirable in many Middle and Far Eastern countries. Milk-fed lamb is especially delicate in flavour. The colour of the lean deepens as the animal grows older. In the lamb it ranges from light to dark pink; in yearling mutton it is medium pink to light red; in mutton it is light to dark red in colour. The fat, soft and

creamy white to pale pink in the lamb, hardens and whitens in older sheep. Bones also harden and whiten, becoming porous in the yearling and extremely hard in the mature animal.

The primary lamb- and mutton-consuming countries are New Zealand, Australia, Greece, Uruguay, and Ireland. The leg, saddle, and shoulder, although they contain higher proportions of bone to meat, are considered the finest cuts by some cooks. In the United States popular cuts include individual chops from the ribs or loin, the leg. A regional specialty, actually unknown outside of the state of Kentucky, is barbecued mutton. Curried mutton, served with ice, is a favourite dish of Jamaicans.

The traditional British lamb roast is distinguished by a fresh mint sauce. Lamb also plays an important part in classic French cuisine; unlike American- or English-style preparation, however, French recipes often require shorter cooking times, yielding rare or pinkish meat.

### **I. Place the missing words in their proper order:**

1. Lamb is ... before the age of one year, and the ... of such ... . (animals, flesh, sheep)
2. ... refers to the flesh of the mature ... or ... at least one year old. (ewe, mutton, ram)
3. Bones also ... and whiten, becoming ... in the yearling and extremely hard in the ... animal. (harden, mature, porous)
4. The leg, ... and shoulder, although they contain higher proportions of ... to meat, are considered the finest ... by some cooks. (bone, cuts, saddle)
5. The traditional British lamb ... is distinguished by a fresh ... sauce. (mint, roast)

### **II. Answer the following questions:**

1. What are young sheep called?
2. Which countries are leaders in lamb consumption?
2. What is a favourite dish of Jamaicans?



3. What do French recipes require?

### **OFFAL**

Offal is also called variety meats, any of various non-muscular parts of the carcasses of beef and veal, mutton and lamb, and pork, which are either consumed directly as food or used in the production of other foods. Variety meats have been a part of the human diet since the invention of cooking, which made the otherwise indigestible animal parts edible. In nutritional terms, several variety meats are richer in certain vitamins, minerals, and forms of protein than muscle tissue; calf's liver, for example, is a major dietary source of iron, and sweetbread (thymus) is considerably higher in the water-soluble protein albumin than is beef.

Beef offal includes the stomachs, tripe, or large stomach, brains, heart, liver, tongue, and kidneys. For young beef, or veal, a number of additional parts, such as spinal marrow, trotters (feet), mesentery, and the sweetbread, are counted among the variety meats. Mutton and lamb offal includes the kidneys, tongue, brains, feet, stomach, heart, liver, and lungs. In pork, the designation includes the liver, kidneys, brains, trotters, and head. Pigs' intestines are used as containers in the manufacture of sausages, and pigs' blood is an ingredient in black pudding.

#### **I. Complete the sentences using the words from the text and translate them:**

1. Offal is also called ....
2. Variety meats have been a part of ....
3. Beef offal includes ....
4. Mutton and lamb offal includes .....
5. Pigs' intestines are used .....

#### **II. Retell the text.**

## PART II

### MILK

Milk is a white liquid produced by the mammary glands of female mammals. The female ability to produce milk is one of the defining characteristics of mammals. It provides the primary source of nutrition for newborns before they are able to digest other types of food. The early lactation milk is known as colostrum, and carries the mother's antibodies to the baby. It can reduce the risk of many diseases in the baby.

The exact components of raw milk varies by species, but it contains significant amounts of saturated fat, protein and calcium. Aquatic mammals, such as seals and whales, produce milk that is very rich in fats and other solid nutrients when compared with land mammals' milk.

Humans, like other mammals, can consume mother's milk during their infancy. In many ethnic groups, people lose the ability to digest milk after childhood (that is, they become lactose intolerant), so many traditional cuisines around the world do not feature dairy products. On the other hand, those cultures that do tolerate milk have often exercised great creativity in using the milk of domesticated ruminants, especially cows, but also sheep, goats, yaks, water buffalo, horses and camels. For millennia, cow's milk has been processed into dairy products such as cream, butter, yoghurt, ice cream, and especially the more durable and easily transportable product, cheese. Industrial science has brought us casein, whey protein, lactose, condensed milk, powdered milk, and many other food-additive and industrial products.

The term milk is also used for non-animal substitutes such as soy milk, rice milk, almond milk, and coconut milk, and even the regurgitated substance pigeons feed their young, called crop milk, which bears little resemblance to mammalian milk.

#### *Some More Facts About Milk*

Milk is known to be highly nutritious, versatile food that has been used by humans since the beginning of recorded time. People enjoy drinking milk in its natural

form and also use it to make a wide range of food products (cream, butter, yoghurt, cheese, ice cream).

Humans drink the milk produced from a variety of domesticated mammals including cows, goats, sheep, camels, reindeer, buffaloes, llama. But cow milk is the main type of milk used for commercial production and consumption throughout the world. Cow milk has been found to contain about 3.5 to 5 per cent fat, which is dispersed throughout the milk in globules. Scientists consider sweet taste of milk to be due to lactose, a kind of sugar found only in milk. The most important protein in milk is casein, accounting for 80 per cent of milk protein. Other proteins present in milk include albumin and globulin.

Milk contains many minerals, the most abundant of which are calcium and phosphorus. It also has been proved to be an excellent source of vitamins A and B. The milk to be sold commercially should be fortified with vitamin D.

Many factors influence the composition of milk, including breed, genetic constitution of the cow, age of the cow, stage of lactation, interval between milkings and certain disease conditions. In general, the type of feed only slightly affects the composition of milk.

In most countries, almost half of the milk consumed is sold as fresh pasteurized whole, low-fat or skim milk. The rest part of the milk is processed into more stable dairy products of worldwide commerce, such as cream, butter, cheese, dried milks, ice cream, condensed milk.

Milk in its natural form, directly from a cow, is called raw milk. It is an extremely versatile product from which a countless number of commercial products are derived.

Dairy farming dealing with production and use of milk and milk products is one of the important branches of agriculture in many countries. Dairy husbandry includes the management of dairy cows, the cultivation of crops for feed, the production of milk and cream, and the manufacture of butter, cheese, ice cream. Individual high milk-producing cows can produce up to 10,000 litres of milk annually. The best cows can be selected and poor producers can be replaced by better cattle.

The introduction of labour-saving machinery, especially the vacuum milking machine, has made the dairy farmer's work much easier. Besides, modern improvements in refrigeration and transportation have eliminated the influence of climate and adverse weather conditions on milk delivery.

**I. Answer the following questions:**

1. What kind of animal is considered to be the main producer of milk?
2. What characteristics of dairy cows are valued most of all?
3. What are the most important dairy products?
4. What can you tell about dairy farming in Russia?
5. Is milk rich in proteins?
6. Why is it important for man to consume dairy products daily?

**II. Agree or disagree with the following statements:**

1. Milk has been used by humans since the beginning of recorded times.
2. Many food products are made from milk.
3. Sheep milk is the main type of milk used for commercial production.
4. Scientists consider sweet taste of milk to be due to lactose.
5. Lactose is a kind of sugar found in many products.
6. Milk is poor in minerals.
7. Age of the cow doesn't influence the composition of milk.
8. The type of feed greatly affects the quality of milk.
9. Milk in its natural form is called raw milk.
10. The introduction of machinery has made the dairy farmer's work more difficult.

**III. Complete the sentences using the words from the text:**

1. People use milk to make a wide range of dairy ...
2. ... milk is the main type of milk used for ... throughout the world.
3. Scientists consider sweet taste of milk to be due to ... .

4. The most important protein in milk is ... .
5. Milk has been proved to be an excellent ... of vitamins A and B.
6. Many factors ... the composition of milk.
7. Milk in its natural form, directly from a cow, is called ... milk.
8. Dairy farming is one of the important ... of agriculture in many countries.

### **NUTRITIONAL VALUE OF MILK**



Man, in common with other mammals, is born a milk drinker, so milk is considered to be highly important for the nutrition and well-being of mammalian infants.

It is interesting that the milks of all species contain the same nutrients, differing only in proportions. Having found milk good food, man domesticated various species of mammals for dairy purposes through- mil the world.

Cow milk is sure to be the principal type used in the world. Other animals utilized for their milk production include buffalo (in India, Egypt, and the Philippines), goats (in the Mediterranean countries), reindeer (in northern Europe), and sheep (in southern Europe).

Cow milk has been used by man from the earliest times to provide both fresh and storable nutritious foods.

**Answer the following question:**

Milk of which animal is most widely used in the world?

### **COMPOSITION OF MILK**

Hippocrates is generally recognized as the father of medicine and according to one of his early recorded statements, he considered milk to be —the most nearly perfect food.

Although milk is a liquid and most often considered a drink, it contains between 12 and 13 percent total solids and perhaps should be regarded as a food. In contrast, many —solid foods, such as tomatoes, carrots, and lettuce, contain as little as 6 percent solids.

Many factors influence the composition of milk, including breed, genetic constitution of the individual cow, age of the cow, stage of lactation, interval between milkings, and certain disease conditions. Since the last milk drawn at each milking is richest in fat, the completeness of milking also influences a sample. In general, the type of feed only slightly affects the composition of milk, but feed of poor quality or insufficient quantity causes both a low yield and a low percentage of total solids. Current feeding programs utilize computer technology to achieve the greatest efficiency from each animal.

The composition of milk varies among mammals, primarily to meet growth rates of the individual species. The proteins contained within the mother's milk are the major components contributing to the growth rate of the young animals.

Goat milk has about the same nutrient composition as cow milk, but it differs in several characteristics. Goat milk is completely white in colour because all the beta-carotene is converted to vitamin A. Goat milk curd forms into small, light flakes and is more easily digested.

**Answer the following questions:**

1. Who considered milk to be —the most nearly perfect food?
2. What is the difference between goat milk and cow milk?
3. What are the major components of milk?

## **NUTRIENTS OF MILK**

**Protein.** Milk contains a number of different types of proteins, depending on what is required for sustaining the young of the particular species. These proteins increase the nutritional value of milk and other dairy products and provide certain characteristics utilized for many of the processing methods.

Milk is known to be widely used not only in the fresh fluid form, but in some concentrated and preserved forms. It is important that concentrated and dried milk products occupy less space, weigh less, and remain edible longer than fresh milk. Thus, they save storage and packaging space, cost less to transport, and serve as a reserve in times of short supply. Moreover, these products have certain properties that make them especially useful as in the use of nonfat dry milk in dry cake mixes. Concentrated sources of milk solids are required in cookery for preparing numerous foods, which would be diluted by a less concentrated form of milk.

The production of these products seems to be a simple operation as it mainly involves the removal of water. However, the complex nature of raw materials used needs special study by dairy scientists.

**Condensed milk.** This term is usually applied to the product obtained by partially removing water from a mixture of milk and suitable nutritive sweetener. The final product contains about 8.5 percent milk fat and at least 28 percent total milk solids. Being added in sufficient amounts (at least 60 % in the water phase), sugar provides high osmotic pressure and prevents bacterial action and product spoilage, thus facilitating the storage of the product at room temperature. It is interesting that sweetened condensed milk was first produced on a commercial scale in about 1858 in New York, and today it is often sold in refrigerated tank-truck loads' to manufacturers of candy, bakery goods, ice cream, cheese, and other foods.

**Evaporated milk.** The name is reserved for the product made from homogenized milk by concentrating with heat and vacuum to obtain at least 25.5 percent total milk solids and 7.5 percent milk fat, and by further sterilizing of the product in the sealed can<sup>2</sup> at 118°C. It is essential to fortify the product with vitamins A and D. A stabilizer, such as disodium phosphate, is also added to keep the product from separating during processing and storage. To obtain high-quality evaporated milk, new ultrahigh-temperature processing as well as aseptic filling of metal cans are widely practiced.

## **Modern production**

In the Western world today, cow's milk is produced on an industrial scale. It is by far the most commonly consumed form of milk in the western world. Commercial dairy farming using automated milking equipment produces the vast majority of milk in developed countries. The largest producers of dairy products and milk today are India followed by the United States and New Zealand.

## **Processing**

In most Western countries, a centralised dairy facility processes milk and products obtained from milk (dairy products), such as cream, butter, and cheese. In the United States, these dairies are usually local companies, while in the southern hemisphere facilities may be run by very large nationwide or trans-national corporations.

## **Pasteurization and raw milk**

Pasteurization kills many harmful microorganisms by heating the milk for a short time and then cooling it for storage and transportation. Pasteurized milk is still perishable and must be stored cold by both suppliers and consumers. Dairies print expiration dates on each container, after which stores will remove any unsold milk from their shelves. In many countries it is illegal to sell milk that is not pasteurized. Milk may also be further heated to extend its shelf life through ultra-high temperature treatment (UHT), which allows it to be stored unrefrigerated, or even longer lasting sterilization. Those preferring raw milk argue that the pasteurization process also kills beneficial microorganisms and important nutritional constituents. The resulting pasteurized product is said to be less digestible, be less nutritious, and turn rancid (as opposed to sour) with age. However, unpasteurized milk can harbor harmful disease-causing bacteria such as tuberculosis, brucellosis, salmonella, diphtheria. The cows must be maintained in very sanitary conditions and a watchful eye kept as to disease testing and vaccinations for this to be completely safe. Cheeses made with raw milk are regarded as safer as the milk typically had to be heated to some extent anyway to



make the cheese, and this would kill many of the dangerous organisms possibly present.

**Full cream, or whole milk**, has the full milk fat content (about 3-4% if Freisian- or Holstein-breed are the source). For skimmed or semi-skimmed milk, all of the fat content is removed and then some (in the case of semi-skimmed milk) is returned. The best-selling variety of milk is semi-skimmed; in some countries fullcream (whole) milk is generally seen as less healthy and skimmed milk is often thought to lack taste. Whole milk is recommended to provide sufficient fat for developing toddlers who have graduated from breast milk or infant formula.

In the United States and Canada, a blended mixture of half cream and half milk is often sold in small quantities and is called half-and-half. Half-and-half is used for creaming coffee and similar uses. In Canada, low-fat cream is available, which has half the fat content of half-and-half.

Organic Milk (in the United States) or Bio-Milk & Biologique Milk (in Europe) is milk produced without the use of chemical herbicides or pesticides, and generally with more natural fertilizers and higher standards for the animals, and is now easy to find on the shelves in many areas. Demeter certified milk is produced with Biodynamic agriculture methods and is similar in standards to organic milk and biological milk, with a few special farm procedures added that are biodynamic- specific.

Milk often has flavoring added to it for better taste or as a means of improving sales. Chocolate flavored milk has been sold for many years and has been followed more recently by such other flavors as strawberry and banana.

Because milk spoils so easily, it should, ideally, be **distributed as quickly as possible**. In many countries milk used to be delivered to households daily, but economic pressure has made milk delivery much less popular, and in many areas daily delivery is no longer available. People buy it chilled at grocery or convenience stores or similar retail outlets. Prior to the widespread use of plastics, milk was often distributed to consumers in glass bottles, and before that in bulk that was ladled into the customer's container.

In the UK, milk can be delivered daily by a milkman who travels his local milk round (route) using a battery-powered milk float during the early hours. Milk is delivered in 1 pint glass bottles with aluminium foil tops. Silver top denotes full cream unhomogenized; red top full cream homogenized; red/silver top semi-skimmed; blue/silver check top skimmed; and gold top channel island.

Empty bottles are rinsed before being left outside for the milkman to collect and take back to the dairy for washing and reuse. Currently many milkmen operate franchises as opposed to being employed by the dairy and payment is made at regular intervals, by leaving a check; by cash collection; or direct debit.

Although there was a steep decline in doorstep delivery sales throughout the 1990s, the service is still prominent, as dairies have diversified and the service is becoming more popular again. The doorstep delivery of milk is seen as part of the UK's heritage, and is relied upon by people up and down the country.

In New Zealand, milk is no longer distributed in glass bottles. In rural India, milk is delivered daily by a local milkman carrying bulk quantities in a metal container, usually on a bicycle; and in other parts of metropolitan India, milk is usually bought or delivered in plastic bags or cartons via-shops or supermarkets.

In the United States bottles were replaced with milk cartons, which are tall boxes with a square cross-section and a peaked top that can fold outward upon opening to form a spout. Now milk is increasingly sold in plastic bottles. First the gallon and half-gallon sizes were sold in plastic jugs while the smaller sizes were sold in milk cartons. Recently milk has been sold in smaller resealable bottles made to fit in automobile cup holders.

The half-pint milk carton is the traditional unit as a component of school lunches. In the US, pictures of missing children were printed on the larger milk cartons as a public service until it was determined that this was disturbing to children.

### **Spoilage**

When raw milk is left standing for a while, it turns "sour". This is the result of fermentation: lactic acid bacteria turning the sugar inside the milk into lactic acid.

This fermentation process is exploited in the production of various dairy products such as cheese and yogurt.

Pasteurized cow's milk, on the other hand, spoils in a way that makes it unsuitable for consumption. This causes it to assume an unpleasant odor and pose a high danger of food poisoning if ingested. In raw milk, the naturally-occurring lactic acid bacteria, under suitable conditions, quickly produce large amounts of lactic acid. The ensuing acidity in turn prevents other germs from growing, or slows their growth significantly. Through pasteurization, however, these lactic acid bacteria are mostly destroyed, which means that other germs can grow unfettered and thus cause decomposition.

In order to prevent spoilage, milk can be kept refrigerated and stored between 1 and 4 degrees Celsius in bulk tanks. Most milk is pasteurized by heating briefly and then refrigerated to allow transport from factory farms to local markets. The spoilage of milk can be forestalled by using ultra-high temperature (UHT) treatment; milk so treated can be stored unrefrigerated for several months until opened. Sterilized milk, which is heated for a much longer period of time, will last even longer, but also lose more nutrients and assume a still different taste. Condensed milk, made by removing most of the water, can be stored in cans for many years, unrefrigerated, as can evaporated milk. The most durable form of milk is milk powder, which is produced from milk by removing almost all water. The moisture content is usually less than 5% in both drum and spray dried milk.

**I. Answer the following questions:**

1. What are two main proteins in milk?
2. Why is milk lactose called —brain food
3. Why is milk fat especially important to the nutrition and health of man?
4. Why should citizens increase their consumption of milk products?
5. What minerals is milk deficient in?
6. What milk dessert is the most popular? Why?

**III. Give a brief definition of the following phrases:** concentrated milk; condensed milk; evaporated milk; pasteurized milk; raw milk; pasteurization; milkman; whole milk

## **TYPES AND COMPOSITION OF FROZEN DESSERTS**

### **THE ORIGIN OF FROZEN MILK DESSERTS**

Refreshing, appetizing, convenient, adaptable, nutritious — who can deny that these qualities of ice cream, ice milk, and sherbets place them at the top of the preferred list of frozen desserts from milk that can readily fulfil one's desires and satisfy the budget? Primarily frozen milk products were available only to the rich due to expensive refrigeration, but today these products are considered to be foods in the true sense. Being easily digested, milk desserts are preferred both by children and adults because of their convenience and variety.



By varying quantities of main ingredients, numerous types of frozen dairy desserts can be produced. Standards for ice cream and most frozen desserts are closely regulated. In the US, for example, ice cream must contain at least 10 percent fat and 20 percent total milk solids (usual requirements are 20 and 18 percent for plain and bulky ice creams, respectively). In freezing, the volume may be doubled by the inclusion of air (known as overrun), but the increase in volume is limited to 100 percent by the requirement that the finished product weigh at least 2 kg per 4 litres. Total food solids must weigh about 700 grams per 4 litres, thus limiting the water content. Regulations also require all ingredients to be listed, with some additives (such as stabilizers) limited to very small amounts. The principal frozen desserts are ice cream, frozen custard, ice milk, frozen yogurt, sherbet, and water ices.

**Ices.** Being similar to sherbet, but containing no milk solids, water ices are usually composed of sugar (30 percent), fruit juice (20 percent), flavouring, colour,

stabilizer (0.2 to 0.6 percent), citric acid, and water. Overrun in ices should be approximately 30 percent. Ices may be frozen in the same manner as ice cream, but they are often dispensed as liquids into forms in which they are frozen on sticks to make Popsicles<sup>5</sup>.

The Popsicle was invented by Frank Epperson in 1923 accidentally. On a cold winter evening Epperson is said to have left on a windowsill a glass of lemonade containing a spoon. By morning the lemonade had frozen, so he put the glass in water and removed the frozen mass. The invention was patented in 1924.

**Complete the sentences using the words from the text:**

1. Milk desserts are preferred ...
2. The principal frozen desserts are...
3. Water ices are usually composed of ...
4. The Popsicle was invented by ...
5. Ices may be frozen...

**ICE CREAM MANUFACTURE**



The essential ingredients in ice cream are milk, cream, sugar, flavouring, and stabilizer, cheaper ingredients such as dry whey, corn syrup, and artificial flavourings having been introduced to create a lower- cost product.

The first step in ice cream making is formulating a suitable mix, the latter being composed of a combination of dairy ingredients, such as fresh milk and cream, frozen cream, condensed or dried skim, buttermilk, dairy whey, or whey protein con-

centrate. Sugars may include sucrose, corn syrup, honey, and other syrups. Stabilizers and emulsifiers are added in small amounts to help prevent formation of ice crystals, particularly during temperature fluctuations in storage.

The ice cream mix is pasteurized at no less than 79°C for 25 seconds. The heated mix is typically homogenized in order to assure a smoother body and texture.

After homogenization, the hot mix is quickly cooled to 4.4°C. The mix must age at this temperature for at least four hours to allow the fat to solidify and fat globules to clump. This ageing process results in quicker freezing and a smoother product.

The next step, freezing the mix, is accomplished by one of two methods: either continuous freezing, which uses a steady flow of mix, or batch freezing, which makes a single quantity at a time. For both methods, the objective is to freeze the product partially and, at the same time, incorporate air.

**I. Choose English equivalents to the following Russian words:** приправа, сухая сыворотка, искусственные ароматизаторы, недорогой продукт, молочные ингредиенты, пахта, мед, колебания температуры, texture, слипаться, охлаждаться, заморозка, процесс созревания

## YOGURT



Yogurt originated in Eastern Europe and it is believed to have been food in the Balkan countries for at least 2000 years. Even today, the consumption of yogurt is more than 10 times greater per capita in Europe than in the United States. However, sales of yogurt in the United States as well as in Russia have increased in recent years more than those of any other item in the dairy produce. This is largely due to the introduction of fruit-flavoured yogurts and to an increased appreciation among consumers of the low-calorie, highly nutritional aspects of yogurt. Its most popular uses are as a between-meal snack, as a dessert, and as the noon meal.

## Do you like yogurt? Is it popular in our country?

### BUTTER



When the making of butter originated is not really known. The Greeks are said to have learnt about butter from the Scythians, and the Romans from the Germans. Ancient Hindus are found to have valued cows according to the amount of butter that could be churned from their milk. Whatever the origin,

butter has been used as food, and sometimes as a medicinal and cosmetic, for at least 5,000 years. However, it had not become perfect food before the application of modern science.

Delightful flavour of butter is due to about 50 different types of chemical compounds that have been identified in this product. It is the balanced quantity of various substances present in low concentrations that makes butter a particularly widely used and a major ingredient of sauces, dressings, confections, cookies, etc.

Butter is known to be one of the most highly concentrated forms of fluid milk. One should process twenty litres of whole milk to produce one kilogram of butter. This process leaves approximately 18 litres of skim milk and buttermilk, which at one time were disposed of as animal feed or waste. Today the skim portion has greatly increased in value, as it is fully utilized in other products.

The colour of butter reflects the concentration of carotene, which is known as yellow, fat-soluble pigment and a precursor of vitamin A. This substance always presents in the cream from which butter is made, but the colour of cream varies with seasonal changes in the carotene content of feeds. Thus, it is deep yellow when cows graze or are fed green forage and is pale yellow when dry feeds are fed in winter. As a result butter may contain added colouring, early buttermakers having added carrot juice in winter months to increase the intensity of colour in butter. Today manufacturers add food colouring throughout the year to ensure a consistent colour. Colouring

may be an extract of annatto seed or synthetic beta- carotene. As both colouring materials are oil-soluble, therefore, having been added to cream before churning, they are not lost in the buttermilk.

When transportation and the value of the skim portion improved, whole milk was shipped to the creamery, providing a supply of —sweet cream (i.e., cream that had not soured) for butter-making. These improvements were followed by the production of high-quality butter. Actually all butter in the United States today is sweet cream butter. A great exception is butter made from whey cream, which is used in the cheese-making process. The quality of fresh whey cream butter is indistinguishable from sweet cream butter.

**Answer the following questions:**

1. How long has been butter used as food?
2. What makes butter to be particularly widely used?
3. How many litres of whole milk should be processed to produce one kilogram of butter?
4. Does the colour of butter depend on seasonal feeds?

**BUTTER PRODUCTION**



Butter is commonly churned from cream, although it may be churned from milk. Butter has been found to be produced when the cream emulsion in unhomogenized milk is destabilized by agitation, or churning. Being broken the emulsion produces butterfat granules with the size of rice grains, which meet together and separate from the water phase or serum as buttermilk.

At the next step the butterfat should be washed with clean water and —worked (kneaded) until more buttermilk separates and is removed. Finally, only about 16 percent of the water and milk solids presented in the original milk remain in the butter.



The churning process can take 40 to 60 minutes to be completed in a traditional churn, but butter is likely to be more commonly made by high-speed continuous —churns‖ in factories. Although the basic principle is the same, in the continuous churn cream

is pumped into a cylinder and mixed by high-speed blades, forming butter granules in seconds. The butter granules are forced through perforated plates while the buttermilk is drained from the system. One can add a salt solution if salted butter is desired. Being immediately packaged, butter is known to be kept well for a long time when it is frozen.

**Retell the text in short.**

## **CHEESE**

Cheese is a solid food made from the milk of cows, goats, sheep, and other mammals. It has historically been the most economically important component of the dairy industry, as it can be stored and transported more easily than fresh milk. Cheese is made by curdling milk using some combination of



rennet (or rennet substitutes) and acidification. Bacteria acidify the milk and play a role in defining the texture and flavor of most cheeses. Some cheeses also feature molds, either on the outer rind or throughout. There are hundreds of types of cheese produced all over the world. Different styles and flavors of cheese are the result of using milk from various mammals or with different butterfat contents, employing particular species of bacteria and molds, and varying the length of aging and other processing treatments. Other factors include animal diet and the addition of flavoring agents such as herbs, spices, or wood smoke. Whether the milk is pasteurized may also affect the flavor. The yellow to red coloring of many cheeses is a result of adding

annatto. Cheeses are eaten both on their own and cooked as part of various dishes; most cheeses melt when heated.

For a few cheeses, the milk is curdled by adding acids such as vinegar or lemon juice. Most cheeses, however, are acidified to a lesser degree by bacteria, which turn milk sugars into lactic acid, followed by the addition of rennet to complete the curdling. Rennet is an enzyme mixture traditionally obtained from the stomach lining of young cattle, but now also laboratory produced.

**Give the Russian equivalents:**

mammals, dairy industry, curdling, rennet, acidification, flavor, mold, aging, herbs, wood smoke, annatto, to melt, lactic acid, stomach, mixture

**Answer the question:**

Imagine that you are the owner of a cheese shop. What kind of cheeses would you recommend for your customers keeping the diet? Why?

### **THE HISTORY OF CHEESE-MAKING**



The real beginning of cheese-making is unrecorded in history. However, it must have occurred within a few centuries after the domestication of the cow and other mammals at about 8,000 BC. Records of cheese reach into ancient times in Arabia, Egypt, India, Israel, and Greece.

No one knows exactly who made the first cheese, but, according to one ancient legend, it was made accidentally by an Arabian merchant crossing the desert. The merchant put his drinking milk in a canteen made from dried sheep's stomach. His way was long, so he delayed sampling from the canteen until he was thirsty. As he opened it at last, he was surprised to find not milk, but a thin watery fluid (called whey now) and snowy-white curd, which was the world's first cheese. This transformation of milk can be easily explained. The natural rennin of the canteen, along with

the heat from the sun, caused the milk to coagulate and separate into curds and whey. The whey is believed to have satisfied the traveller's thirst, and the curd had a delightful flavour and satisfied his hunger.

**Retell the text.**

### **COTTAGE CHEESE**

This soft, unripened cheese is made from skim milk (or reconstituted dry skim milk in certain countries, such as Japan), using lactic acid bacteria and a small amount, if any, of rennet. By law, it must contain no more than 80 percent moisture (82.5 percent in low-fat cottage cheese). Creamed cottage cheese must contain at least 4 percent milk fat, whereas the low-fat variety may contain from 0.5 to 1.5 percent fat, dry cottage cheese containing only a trace of fat. The protein of most cottage cheese is nearly all casein, but one company has a patented process whereby skim milk is heated to denature whey proteins which are then partially precipitated with casein. This process is called coprecipitation. In the manufacture of casein from skim milk, it is possible to coprecipitate most whey proteins. About 96 percent of the proteins in milk can be recovered. Combinations of heat and calcium chloride, or of heat and acid are used to induce precipitation.

Flavour, aroma, body, texture, and appearance vary widely among market samples. The most common flavour is acid, but its intensity may vary from mild to sharp. Body may be either firm or soft; particle size maybe small (less than 0.6 cm) or large (1.3 cm); cream may be well absorbed and stabilized or free from curd. Each manufacturer decides which characteristics are most desired by his customers and then tries to produce that same type of cheese day after day.

### **GOAT CHEESE**

Although cow's milk and goat's milk have similar overall fat contents, the higher proportion of medium-chain fatty acids such as caproic, caprylic and capric acid in goat's milk contributes to the characteristic tart flavour of goat's milk cheese.

Goat milk is often consumed by young children, the elderly, those who are ill, or have a low tolerance to cows' milk. Goat milk is more similar to human milk than that of the cow, although there is large variation among breeds in both animals. Although the West has popularized the cow, goat milk and goat cheese are preferred dairy products in much of the rest of the world. Because goat cheese is often made in areas where refrigeration is limited, aged goat cheeses are often heavily treated with salt to prevent decay. As a result, salt has become associated with the flavour of goat cheese, especially in the case of the heavily brined feta.

Goat cheese has been made for thousands of years, and was probably one of the earliest made dairy products. In the simplest form, goat cheese is made by allowing raw milk to naturally curdle, and then draining and pressing the curds. Other techniques use an acid (such as vinegar or lemon juice) or rennet to coagulate the milk. Soft goat cheeses are made in kitchens all over the world, with cooks hanging bundles of cheesecloth filled with curds in the warm kitchen for several days to drain and cure. If the cheese is to be aged, it is often brined so it will form a rind, and then stored in a cool cheese cave for several months to cure.

Goat cheese softens when exposed to heat, although it does not melt in the same way many cow cheeses do. Firmer goat cheeses with rinds are sometimes baked in an oven to form a gooey, warm cheese, which is ideal for spreading on bread with roasted garlic, or alone.

### **I. Restore the original sentences:**

1. consumed; the elderly; is; young children; goat milk; and; often; by
2. is; in areas; often; is; limited; made; where; goat cheese; refrigeration 3. salt; with; the flavour; has become; cheese; associated; of; goat
3. salt; with; the flavour; has become; cheese; associated; of; goat

## PART III

### Food and Health



The food we eat can affect our health in many ways. If we eat food that's contaminated with bacteria, we'll be sick and go to the toilet more often. We can also get sick if we eat dangerous foods like poisonous mushrooms or certain kinds of fish. These foods have short-term effects on our health,

but food can also have longterm effects on our health.

These long-term effects vary depending on where we live and how much we eat. In a country with food shortages due to war or lack of rain, people might suffer from malnutrition. People with malnutrition lose a lot of weight and become very thin and weak. They can also develop long-term illnesses due to the lack of essential nutrients like vitamin C and iron. People in rich, developed countries can also develop food-related illnesses, but they're usually related to eating too much, or overeating, rather than eating too little.

The term malnutrition is made from the combining form mal- (bad) + the noun nutrition (food, nourishment, eating). It therefore means "bad eating", and covers "wrong" eating, under-eating and over-eating. Other words formed with mal- include: malpractice, malfunction, malodorous

#### **Overweight and obesity**

People who overeat can become overweight, especially if they don't exercise. Being a little overweight isn't usually related to serious health problems, but putting on more weight and becoming obese definitely is. This is because obesity is a major risk factor for many serious illnesses that can be fatal and shorten our lives by many years.

People who are suffering from malnutrition can usually recover by simply eating nutritious food, but people who are obese face a far more difficult situation. To

recover they must lose a lot of weight by eating less and changing to a healthy diet<sup>1</sup>. This can be very difficult to do, especially if they live in a place full of Western-style fast foods and processed foods. And even if they lose weight by going on a diet<sup>2</sup>, most people soon return to their usual diet and put the weight back on. So learning about food and health and how to prevent obesity in the first place is one of the most important things we can learn.

All the energy our bodies need comes from the food we eat, and it's measured in calories. If we balance the calories we get from food with the number we "burn" each day as energy, our body weight stays the same. But if we eat more food than we need, the extra energy is stored as body fat and we put on weight. You can check to see if your body weight is healthy or not by measuring your height and weight and then calculating your body mass index (or BMI) with a special formula. If your BMI is between 18.5 and 25, your weight is healthy. If it's between 25 and 30, you're overweight, and if it's over 30, you're obese and need to change your diet.

### **The obesity epidemic**

Before the 1970s obesity wasn't a serious problem, but in the mid-70s obesity rates began rising in Western countries like the USA, UK and Australia. These were the first countries in which major food companies began increasing their profits by selling more snack foods, fast foods and processed junk food than ever before. Fast food companies opened hamburger, pizza and fried chicken outlets in every big town and city and spent huge amounts of money marketing them. Major food companies filled supermarkets with frozen "TV dinners" and convinced families they were as healthy as home-cooked meals. They marketed more and more sweets, snack foods and sugary drinks to children even though they knew they were damaging their health and ruining their teeth. They spent millions of dollars lobbying governments in order to stop them from regulating their industry and reducing their profits.

In the 1990s Western food companies began targeting people in developing countries as well, and many are now eating hamburgers, pizzas and other Western foods instead of traditional local foods. As a result, obesity rates have increased greatly in those countries as well. According to the World Health Organization

(WHO), only 1% of the world's children were obese in 1975, but the number is now 10 times higher. The number of overweight and obese adults has also increased greatly since 1975 and is now over 2 billion people. The situation has become so serious that it's being called an obesity epidemic.

An epidemic usually involves just one disease, but the obesity epidemic is related to several diseases. It's a major risk factor for heart disease and heart attacks, high blood pressure and strokes, diabetes and kidney disease, and many kinds of cancer, all of which can be fatal. And our risk of developing one of these diseases increases every time we eat certain dangerous or fattening foods.

### **Dangerous foods**

Most nutritionists now agree that a diet of Western-style processed food and fast food is one of the unhealthiest diets of all. This is because it's so high in saturated fats, trans fats, sugar and salt, all of which can be a danger to health.

### **Saturated fats and trans fats**

Saturated fats and trans fats are dangerous because they increase our blood levels of cholesterol, a substance that can form fatty lumps that block blood flow and cause heart attacks and stroke. The worst foods for saturated fats include bacon, sausages, hamburgers, fatty steaks, ham and salami pizzas, high-fat cream, etc.

Trans fats are even more dangerous and harder to avoid because food companies use them so often. They can be found in potato crisps, donuts, pastries, cookies and other processed foods as well as in margarine and oils used to make French fries, onion rings and other deep-fried foods. They're banned in New York City and certain other places, but still used elsewhere even though the WHO has said they cause over half a million deaths every year. (Source: WHO News Release, 14 May 2018)

### **Trans Fats**

Trans fats make cookies, donuts, French fries and many other foods taste better and last longer, but the World Health Organization (WHO) says they cause over 500,000 deaths EVERY YEAR!! To find out more, check out our Featured Reading!

## **Sugar**

Sugar is a natural carbohydrate found in fruits and vegetables, but it's also added to thousands of products to make them taste sweeter. It's added to soft drinks and energy drinks, flavoured yoghurt, cereals, cookies, cakes, sweets and candy, and most other processed foods. Too much sugar can cause obesity and diabetes as well as heart disease. Just one soft drink or energy drink contains nearly half the sugar we should consume in one day, so anyone on a diet of Western-style processed foods is sure to consume too much. In 2014 Dr. Frank Hu, professor of nutrition at Harvard University, wrote, "The effects of added sugar intake — higher blood pressure, inflammation, weight gain, diabetes, and fatty liver disease — are all linked to an increased risk for heart attack and stroke."

## **Salt**

We all need a little salt in our diets, but consuming more than 5 or 6 grams per day can lead to high blood pressure which is a major risk factor for heart disease, stroke and kidney disease. A high-salt diet is also a probable risk factor for stomach cancer. Salt is added to so many products (often listed as sodium or sodium chloride on the packet) that it's become yet another reason to avoid processed foods.

## **Healthy diets and food**

### **Mediterranean Diet**

Mediterranean and Japanese diets are similar and both are linked to low rates of diet-related illness like heart disease. Should we use them as a guide to healthy eating? Many experts now think so.

*fresh vegetables, fish and seafood, grains (esp. wholewheat bread and pasta), beans, legumes and nuts, fresh and dried fruits, eggs and dairy foods in moderation, olive oil*

Many nutritionists now recommend low-fat diets like this, or the similar pescetarian diet that includes dairy products, fish and seafood, but no poultry or red meat like pork or beef. Some are even recommending a totally meat-free vegetarian or vegan diet, especially for people with heart disease or other diet-related illnesses. But if



you become vegetarian or vegan, they say you must make sure you get all the essential amino acids from protein-rich plant foods like soybeans.

### **Summary**

If we eat healthy foods in a balanced diet, there's a good chance we'll live long and healthy lives. A balanced diet should provide around the same number of calories as the body uses each day. This allows us to maintain a healthy BMI by ensuring we don't lose or gain too much weight. Our diet should include a wide variety of fresh, natural foods with a good balance of nutrients plus all the essential vitamins and minerals. We should try to avoid fatty foods and processed foods that contain substances that can be dangerous like sugar and salt, and additives such as preservatives, colourings and artificial flavourings that might not have been tested for long enough. And we should definitely avoid Western-style fast foods that contain saturated fats and trans fats.

**They say, "If we eat healthy foods in a balanced diet, there is a good chance we'll live long and healthy lives". How can you explain this phrase? Do you agree with it? Why? Give your own examples to support your argument.**

### **Food Vocabulary**

*body mass index (or BMI) (noun):* a weight-to-height ratio that shows if you're overweight, underweight or at a healthy weight- Jason's body mass index is 27, so he's a bit overweight.

*calorie (noun):* a unit for measuring the amount of energy we get from food - How many calories are there in a can of soft drink?

*carbohydrate (noun):* a substance in foods such as bread and potatoes that is a major source of energy or calories - Is limiting carbohydrates a good way to lose weight?

*cancer (noun):* a serious illness that is usually difficult to cure and often leads to death - My cousin died of lung cancer when he was fifty.

***cholesterol (noun)***: a substance in body cells that can cause heart disease if levels in the blood are too high - The test shows you have too much bad cholesterol in your blood.

***consume (verb)***: to eat or drink something - How many calories should we consume every day?

***contaminate (verb)***: to make something a carrier of disease - Food that isn't stored properly can become contaminated with dangerous bacteria.

***diabetes (noun)***: a serious illness in which your body cannot regulate the amount of sugar in the blood - Being obese is the most common cause of type 2 diabetes.

***diet (noun)***: all the foods a person normally eats - My doctor said a vegetarian diet rich in plant protein is best.

***diet (noun)***: a limited amount or range of food that someone eats to lose weight or become healthier - I've been on lots of diets but I'm still overweight.

***epidemic (noun)***: the sudden spread of a disease or medical condition - Processed foods are causing a global obesity epidemic.

***fast food (noun)***: food served quickly, esp. Western foods like hamburgers, pizzas, fried chicken and French fries - Fast food joints are everywhere around here.

***heart disease (noun)***: a medical condition in which the heart fails to work properly - Eating healthy food prevents heart disease.

***high blood pressure (or hypertension) (noun)***: a condition in which the blood pressure is higher than it should be - High blood pressure can cause strokes, can't it?

***junk food (noun)***: unhealthy food, esp. fatty fast foods and processed snack foods - Kids eat far too much junk food these days.

***lobby (verb)***: to contact people with power like politicians and try to influence them for your benefit - The food industry spends millions of dollars lobbying politicians.

**malnutrition (noun):** a condition of weakness or illness caused by eating too much food, not enough food or unhealthy food - There are still many poor people who suffer from malnutrition **market (verb):** to use advertising and other persuasive methods to make people want a product - Shouldn't people who produce and market dangerous foods be punished?

**nutrient (noun):** a substance in food that is necessary for good health - A healthy diet gives us all the nutrients we need.

**nutritious (adjective):** (of food or drinks) containing substances we need in order to be healthy - Japanese food is both nutritious and delicious.

**obese (adjective):** very fat; far above a healthy weight (BMI >30) - Why are so many people in Australia obese these days?

**obesity (noun):** the state of being very overweight, or the medical condition related to this - If marketing junk food to kids causes obesity, why isn't it banned? **overeat (verb):** to eat more food than the body needs - If I didn't overeat, I wouldn't be overweight.

**overweight (adjective):** above a normal or healthy weight (BMI 25-30) - How can I stop my kids from becoming overweight?

**pescetarian (adjective):** (of a diet) including vegetarian food and fish, but no other meat - My cousin thinks farming animals and chickens is cruel and bad for the planet, so he's pescetarian.

**preservative (noun):** a chemical substance used for preventing food from spoiling or wood from decaying - Many processed foods have added preservatives and artificial colourings and flavourings.

**process (verb):** to add chemicals or other substances to food to make it last longer or look or taste better - The processed food industry makes a huge amount of money.

**profit (noun):** money made by selling a product or service - Companies will do whatever's necessary to increase their profits.

**saturated fat (noun):** a type of fat that's found in butter, cheese, red meat, etc. - Reducing the amount of saturated fat in your diet can help you live longer.

**stroke (noun):** the sudden bursting of a blood vessel in the brain that can cause serious illness or death - After he had a stroke, Harry couldn't walk or talk normally. **trans fat (or trans fatty acid) (noun):** an artificial fat that makes food last longer and taste better but is very bad for health - Trans fats are banned in many places because they're so bad for our health.

**vegan (adjective):** (of a diet) with plant foods only; without animal products, including meat, fish, seafood, eggs, milk, cheese, etc - Let's try sticking to a vegan diet.

**vegetarian (adjective):** (of a diet) with plant foods and sometimes dairy products, but without meat, fish, or seafood - Most people I met in India were vegetarian.

## PART IV

### FOOD TECHNOLOGY



#### What is food technology?

Food technology is the study of how different foods can be used and made into food products.

Before they are ready to be sold in the shops, food products go through a series of tests and studies to make sure that they are:

- safe to eat;
- good to eat;
- easy to use;
- well packaged; □ a reasonable price.

## **The food industry**

The food industry is very large and includes:

- food producers (people who grow food);
- food manufacturers (people who make food products);
- food distributors (people who supply foods to shops, restaurants, schools, hospitals);
- food retailers (people who sell food);
- food providers (people who cook and sell food in restaurants, canteens, etc.)

People have been growing, making and selling food to other people for hundreds of years, but it was during the 20<sup>th</sup> century that the food industry became very large. Why did this happen? What were the consequences of the growth of the food industry?

### **This happened because:**

1. Governments encouraged farmers to grow more food.
2. Transport by land, sea and air became easier.
3. There was the growth of technology.

### **The consequences are the following:**

1. Many foods became cheaper and easier for people to buy. **But:** This resulted in environmental damage and big changes to the countryside (loss of hedges, ponds and woodland and other natural habitats for wildlife).

2. People travelled abroad and tried food from other countries. Food grown in one country could be sent to another country and arrive there in good condition. People used cars to buy their food from supermarkets. **But:** This resulted in air pollution and less exercise for people; opening foreign restaurants and selling foreign food in shops; the opportunity for people to eat some food (e.g. strawberries) all year round.

3. Food could be grown and harvested on large scale using machinery. New food products were invented, e.g. low-fat spreads, breakfast cereals, instant puddings. New ways of preventing food from going off (preserving food) could be

used, e.g. UHT milk, frozen food, vacuum packaging. **But:** This resulted in less need for working on farms; having more choices for people; less need for food shopping.

### **The design process**

The series of tests and studies that all new products go through before they are ready to be sold is called the **design process**. All new products, including cars, toys, kitchen equipment, medicines, and so on, go through a similar process.

There are several stages in the design process for food products. A food manufacturer may repeat some stages when designing a new food product.

#### **Stage 1: Is a new product needed?**

This can be called ‘\_establishing a need’. There are several reasons why a manufacturer might think a new product is needed:

- a customer might ask for a new product;
- research may suggest a new product is needed;
- there may be a problem with an existing product, so it needs to be changed;
- there may be changes in the types of food people want to eat, for example, they may want foods with less fat or sugar in them.

To find out more about whether a new product is needed, the manufacturer might carry out some **market research**. Market researchers will find out about the people who they think might buy the product and about similar products that are available:

#### **About people:**

- why people buy certain food products;
- how people live (their lifestyle);
- how much money they spend on food;
- how much cooking they do at home;
- how often they eat out in restaurants;

➤ how much notice they take of food issues, e.g. healthy eating advice, where and how food is grown, food advertising, damage to the environment, animal welfare. **About food products:**

- how they are made;
- what they look, smell, taste and feel like;
- what happens when they are frozen, cooked in a microwave oven, baked and so on;
- how well their packaging works (it is easy to read and open, does it protect the food?)
- are they suitable for vegetarians, people with allergies, babies, and so on?
- do they meet people's needs, e.g. are they easy to prepare and use and healthy, are the portion sizes suitable?

To find out such information, market researchers use a variety of methods, for example:

- **Interviews** with people, in which they are asked questions from a survey or questionnaire. This might be done through the post, on the telephone, or face to face in the street.
- **Sampling** similar food products to the one being designed, and giving opinions about the products and marks for flavour, colour, shape, packaging, and so on. This is called **sensory analysis**.
- Using the results of surveys published by other people and organizations, for example. The National Food Survey, MORI, Sodexo.

### **Stage 2: What should the new product be like?**

The manufacturer has to write down a list called a **specification**. The **first (initial)** specification may be changed as the product goes through the design process. The **final** specification is the one that will be used to make the product that will be sold. The manufacturer includes: **All the things they want included in the new product, for example:**

- its shape and size;
- its flavour and colour;
- what it will be used for, for example, a snack, a main meal, a party food;
- what ingredients it will contain;
- what nutrients it will contain;
- how it will be made;
- how it will be packaged and stored;
- who it will be advertised to, for example children, teenagers, single people (this is called the **target group**);
- what it will cost to make and the price it will sell at;
- what ‘image’ it will have, for example everyday, luxury, fashionable, reliable, versatile (lots of uses).

**The manufacturer also has to specify all the things the law says they *must*, or *cannot*, include in the new product, for example:**

***cannot***

- a certain amount or type of nutrients, for example sugar or fat;
- a certain type of additive, for example a colour or preservative;
- a particular method of preserving or packaging it;
- a particular way of advertising it.

***must***

- certain information on the label.

**Stage 3: Developing the new product**

Sampling of the new product will be made and tested to see:

- how it tastes, smells and feels;
- what it looks like;
- what happens when it is cooked;
- how well it can be stored;
- how best to package it.

Some of the ingredients, or the amounts used, may need to be changed to improve the product, for example, its flavour, texture or image. A **final specification** will be produced once the results of the tests are known.

**Stage 4: Making the product**



The real product, complete with all the packaging, will now be made. This is often called the **prototype**. As the prototype is being made, information is collected to see whether there are any problems with how it is made, or the machinery, ingredients, or packaging used.

One very important piece of information is how **safe** the food product is to eat. Food can be made unsafe to eat by tiny forms of life called **micro-organisms** (often called germs). These can get into the food if it is not carefully made and will cause **food poisoning**. The food manufacturer must check all stages of production to make sure that micro-organisms are not allowed to grow in the product while it is being made, or afterwards, while it is being stored.

### **Stage 5: Judging the product**

The product is tested and judged by trained people and ordinary members of the public. This process is sometimes called ‘evaluating’. The manufacturer will use their judgments and the results of the tests to make a final decision about making and selling the new product in the shops.

### **Stage 6: Putting the product on sale**

The food manufacturer might decide to advertise and sell the new food product in one particular area of the country, to see how well it sells. This is called a **product trial**. If it sells well, it will be sold elsewhere.

If the product doesn’t sell well, it may be tried in a different area or taken out of production. Or it may need to have flavour or colour improved. Sometimes, food products that have been on sale for a long time are changed slightly and sold as a ‘new, improved’ product to encourage people to buy more of them.

An important point for the manufacturer to consider is to how to move products from one place to another (**distribution**). This includes:

- ✓ collecting raw materials (ingredients and packaging materials) or having them regularly delivered by suppliers
- ✓ storing finished food products

✓ sending the finished products to shops, restaurants, warehouses and so on in good condition and on time.

**Exercise 1. Give Russian equivalents to the following word combinations:**

Food technology, food industry, food producer, food manufacturer, food distributor, food retailer, food provider, design process, market research, food advertising, the National Food Survey, MORI, Sodexo, target group, food poisoning, product trial

**Exercise 2. Give Russian equivalents to the following word combinations:**

To be used and made into smth, to go through a series of tests/studies, to provide smbd with smth, to encourage smbd to do smth, in good condition, on a large scale, to prevent smth from smth, to improve the product, to need a new product, to be/look like, to develop a new product, to make a new product, to judge the product, to put the product on sale/ to sell the product, to check the stages of production, to advertise a new product, to move from one place to another,

**Food science**

Some foods can be eaten raw, while others are cooked to make them easier and nicer to eat. Some foods are mixed with other foods to make a different food product.

Food science is the study of what happens to foods when they are cut, whisked, melted, frozen, cooked, left in the open air, or mixed with other foods. Some changes to foods can be seen with the naked eyes, some cannot.

Understanding how foods change will help you to understand what has happened if your cooking goes wrong and to design new food products.

**Foods to suit different needs**

Lots of research has been carried out to find out the best way to enjoy a healthy life. Food is a vital part of our lives and much of our time is spent on its preparation.

The current advice for people who want to stay healthy is:

- Eat less sugar and sugary food.
- Eat less fat – especially solid fats from animals.
- Eat less salt and salty foods.
- Drink less alcohol.
- Eat more dietary fibre and starchy foods.
- Eat lots of fruit and vegetables – at least 5 portions a day – fresh, frozen

or canned.

- Eat a mixture of foods.
- Enjoy your food.
- Try to stay at a healthy weight.
- Be more active, e.g. walk, rather than ride in a car; use the stair, not the

lift or escalator; take up a sport such as swimming or football; don't spend too much time sitting in front of the TV or playing computer games.

There is now a great variety of foods to choose from in the shops, thanks to advances in food production, technology, transport, and storage. In our multicultural society many foods are imported from overseas. Foreign restaurants and take-away food shops have also contributed to the change in eating habits.

## **Food production and the environment**

### **The environment**

In Britain in the 20<sup>th</sup> century, the problems of food storage during the Second

World War and concerns about growing populations made the government encourage farmers to grow more and more food. To do this, farmers have used lots of input, such as:

- **chemicals** to kill insects, animals, weeds and diseases □ **chemical fertilizers** to put nutrients back into the soil
- **man-made, enriched animal feeds** to make animals grow quickly and cheaply

- **antibiotics and other medicines** to prevent disease and make animals grow quickly
- **tractors and farm machinery** to do jobs quickly and with fewer people and working animals.

Many inputs and modern farming methods have had very serious and longterm effects on the environment, including:

- hedgerows, ponds, woodlands, rainforests and other natural habitats have been destroyed to make way for big fields and plantations for crops, and grazing land for animals;
- soils have had water, nutrients, and goodness taken out of them, and replaced;
- waterways (rivers, streams, lakes, ponds and seas) have been polluted with pesticides, fertilizers and animal waste;
- many types of insects, birds, fish and other animals have died out because they either have been poisoned by chemicals or have lost their natural food sources or habitats;
- important materials, like oil and minerals, have been taken from the Earth. They are **non-renewable**.

People have also been affected, because:

- there are not so many jobs available in farming as there are fewer (but larger) farms, and much of the work is done by machines, not people;
- many rural (countryside) communities have disappeared as farms have done;
- they have become ill, because of farm chemicals in their food or drinking water;
- **intensive farming** (where lots of animals are kept together inside in small places) has led to disease passing from one animal to another, and sometimes to humans.

Food manufacturers have also had a big impact on the environment, because:

- they use lots of non-renewable energy sources to produce, store and distribute their lorry;
- they use lots of packaging materials, for example paper, plastics, card, metal and glass, which use energy to make and end up as rubbish, which has to be disposed of.

One of the causes of environmental pollution is the transport of food from the farm to the consumer's home, which may involve ships, aeroplanes, lorries and cars.

Some people have called this ‘food miles’, and some foods travel very long distances.

One of the reasons for this is that large supermarket companies use big **distribution warehouses**, to which food products are sent. They are then sent out from there to individual supermarkets. Another reason is that consumers have become used to having different foods available all year round, so many have to be imported by air or sea from all over the world.

### **Preventing damage to the environment**

There are many ways in which food producers, manufacturers, retailers and consumers can help to prevent damage to the environment:

#### **Producers**

It is possible for farmers to produce food without using chemical inputs or medicines. They can do this by:

- keeping the soil in good condition by using natural fertilizers such as manure;
- growing a different crop on the same piece of land each year, and then letting the land rest for a year (called **crop rotation**)
- using other insects to control insects that damage crops;
- removing weeds by hand or by machines;
- growing crops that suit local conditions, such as soil, weather and rainfall;
- allowing animals to live as naturally as possible.

This type of farming is called **organic farming**. The food produced is, as far as possible, free from added chemicals. Recent food scares and concern about health and the environment have encouraged a growing number of farmers to convert to organic farming. Organic food usually costs more to produce and buy, but as demand grows, prices should gradually come down.

### **Designing food products**

A **recipe** is a list of ingredients and instructions for making the ingredients into a food product. All over the world, thousands of recipes have been invented over the years, and many of these have become part of the traditional food culture of different countries. In modern food technology, a recipe is often called the ‘product specification’, and ingredients may be called ‘components’. Food manufacturers design and use specifications for each product they make.

All food products are made from one of a number of basic recipes. They can be divided into the following groups: sauces; cakes and biscuits; pastries; stews, casseroles, soups, curries; fried food; breads; cereal products; pies, patties, flans, tarts, parcels; confectionery; desserts, puddings; drinks (beverages).

### **Adapting food products**

It may sometimes be necessary to adapt (change) the recipe of a food product for a number of reasons:

- to make it more suitable for people wanting to follow healthy eating guidelines, for example by reducing the sugar content;
- to produce another product in the same range, but with a different flavour or texture;
- to give a product a new image;
- to find a new target group for the product;
- to reduce the cost of the product;
- to find an alternative for an ingredient that is becoming difficult to obtain.

Most recipes can be adapted by:

- replacing one or more of the ingredients with another;
- replacing or increasing the amount of one or more of the ingredients; □ using a different additive, for example, a colouring or a flavouring.

Changing a recipe in some way may cause problems, for example: □ it may affect the shelf-life of the product; □ it may affect how acceptable it is to customers.

### **Processing and cooking food What is processing?**

‘Processing’ means making a series of changes to something. **Food processing** changes some of the features of foods, including:

- how long they stay in a good and safe condition;
- their colour, texture, flavour, appearance; □ how long they take to prepare and cook;
- how easy and convenient they are to use.

Food processing has enabled the food industry to develop new products by:

- Making it possible to make several new products out of one food. For example, potatoes can be turned into chips, crisps, instant mashed potatoes, potato salad, canned potatoes, oven-baked shaped potato pieces, potato waffles.
- Making it possible to make products that are of the same standard and quality every time, so that consumers know what to expect and will buy them again.
- Making it possible to make foods **aesthetically pleasing**.

### **How are foods processed?**

There are a number of processes that are carried out in the kitchen as well as in industry. These include:

- trimming (e.g. vegetables, fish, meat);
- peeling, coring, slicing, chopping, mincing, grating (e.g. fruit, vegetables, meat, poultry, cheese, nuts);
- sieving, separating, crushing, rolling (e.g. flour, sugar, biscuits, spices, pastry, icing);

- whisking, mixing, beating, combining (e.g. cake, biscuit, bread and eggs mixtures, soups);
- grilling, frying, baking, roasting, boiling, steaming, microwaving, poaching, stewing, simmering;
- preserving by freezing, pickling or adding sugar or salt.

In industry, processes that require specialist equipment and knowledge are also carried out.

### **Keeping food products safe to eat**

Every year, thousands of people suffer from **food poisoning**. Food poisoning is caused by **toxins**, which are produced in the food by tiny forms of life called **micro-organisms**. There are three main types of micro-organisms:

- bacteria; □ moulds;
- yeasts.

Not all bacteria, moulds and yeasts are harmful. Some are used in foods. For example, bacteria are used to make yogurt, moulds are used to make some cheeses, and yeast is used to make bread. Harmful micro-organisms are called **pathogenic** micro-organisms or **pathogens**.

Micro-organisms are very small and they are found in many different places, for example water, air, soil, dust, skin, the nose, throat and mouth, sewage, rubbish, animals, foods. This means that they can easily **contaminate** food.

If micro-organisms are given the right conditions – i.e. temperature, moisture and food – they will grow and multiply quickly. As they do so, they produce toxins, which can make people very sick if they eat food. Very perishable foods are the most likely to be contaminated by micro-organisms and associated with food poisoning.

Although it is often impossible to see whether food has been contaminated with bacteria, it is usually possible to see moulds. Yeasts often **ferment** foods (break down the sugars in them to CO<sub>2</sub> gas and alcohol), so that the food tastes ‘fizzy’ and ‘off’.

Food poisoning caused by bacteria include *E.Coli* 0157, *Salmonella* and *Campylobacter*.



## **Keeping the food industry safe**

To help make sure that the food we eat is safe, the food industry has to follow certain rules and regulations. These rules are contained in the Food Safety Act 1990, which covers all aspects of food safety and aims to prevent the sale of food that is harmful to health. Anyone who has a business to do with food has to abide by this Act, and the Act is enforced by **environmental health officers** and **trading standard officers**, who are employed by local councils and authorities.

The Government has created a new agency called the Food Standard Agency, which has the power to monitor the safety and quality of food, from the start of food production until it reaches the consumer. It also offers advice and gives education on matters relating to food safety.

One way of ensuring food safety is to identify possible **risks** and **hazards** during the production, transport, storage and sale of food products. Food businesses are required to make a careful study of their buildings, workers and activities and work out where there are any possibilities for the food they deal with to become contaminated. This type of study is called a **Hazard Analysis of Critical Control Points (HACCP)** for short). What does it mean?

Hazard Analysis = identifying the places, times or activities in the production process where the food could become unsafe

Critical Control Points = the points at which the food is at high risk of becoming unsafe, for example during storage, preparation or cooking

HACCP is also used to check other aspects of food production, for example faults with packaging, unwanted items falling into a food product, or faulty mixing, cooking or chilling.

## **Carrying out research**

Research involves making a careful investigation of something to find out new facts and information about it. In food technology, you might be asked to investigate a number of different topics, for example a new food product; what someone can eat if they have a particular health need; how you can reduce the amount of sugar in a

food product; or how you can make a product attractive to people. Research is a very important part of food product development.

Food technology research can be carried out in different ways:

- reading about a topic to find out facts
- investigating and comparing food products
- doing experiments with foods and recipes
- asking people questions and their opinions

### **Investigating food products**

Looking at and comparing food products can give you some useful information. Here are some ideas of what to look for and investigate:

- **information on the label or packaging**, for example ingredients, nutritional value, additives used, weight or volume, where it was made, storing, preparation, cooking and serving instructions, suitability for different people
- **the cost compared with similar products**, per item or per 100 g or 100 ml
- **the packaging** – how it is made, what it looks like, how well it protects the food, how easy it is to use
- **the flavour, colour, texture, smell** of foods before and after they are cooked or frozen
- **what it is made of** – some products, for example dried soups, muesli, pies, pastries, ready meals, fruit cake, cereal bars, can be taken apart to find out what they contain. The individual parts can either be counted or weighed. This may show that some products are better quality or value for money than others.

### **Exploring ingredients. Nutrition.**

#### **Why do we need food?**

We need to eat food several times every day. This is because we need food to make us **grow**, keep us **healthy**, and give us **energy**. A **mixture** of foods will give us all the things we need. Eating food makes us feel good, and eating together with other people is an important **social** activity.

## **What is food?**

Food comes from plants and animals, and can be either liquid or solid. Food has different colours, flavours, odours and textures and contains **nutrients** and water.

## **What are nutrients?**

Nutrients are special substances that do different jobs in the body. Some foods contain several different nutrients; some foods have only one or two. It is important to eat a mixture of foods every day, in order to get all the nutrients.

It is important to eat a **balanced diet** to give your body the right amount of nutrients. People who do not have enough food, and therefore not enough nutrients to make the body grow, stay healthy, and may suffer from **under-nutrition**. People who have too much or too little of a particular nutrient may suffer from **malnutrition**.

This may result in poor health, for example, too much fat may make the body overweight; too little calcium will make the bones and teeth weak.

## **Presenting food products**

### **Choosing food**

There are a number of factors that affect our choice of food, for example:

- cost
- what there is available to choose from
- likes and dislikes
- beliefs, traditions and customs
- familiarity
- advertising
- the opinions of other people
- fashion and trends
- health and well-being
- appearance and presentation

There is no doubt that the appearance and presentation of food will affect whether or not people choose to eat it. People have expectations about the colour,

shape and texture of foods, which influence their choices. It does not matter if a food product tastes wonderful – if it is poorly presented, it is unlikely to be tasted.

Although the enjoyment of food involves all the senses – sight, smell, taste, touch and hearing – there is no doubt that sight has the first and strongest influence. Food manufacturers and retailers recognize this fact, and spend large sums of money every year perfecting the appearance of their products in order to ensure that they sell. They do this by:

- careful photography of food products, showing them at their best, often with other foods
- designing suitable, attractive packaging
- careful use of colour and shape in products and in advertising
- attractive visual displays of a product

Food producers in restaurants and canteens are also aware of the importance of appearance, and try to produce food that is:

- served in clean, undamaged dishes and plates
- served in a neat and tidy way
- garnished and decorated to make the food look attractive
- served in clean and neat surroundings in which colour and light play a part in making the food look attractive

### **Equipment used in food production**



Whenever food products are made, they will be much easier to produce if suitable equipment is used. When food products are made on a **large scale**, as in factories, special equipment and machinery is designed to carry out

particular **processes**, for example, cutting, mixing, sieving, heating, chilling, packaging. Often computers control these processes. This is called **computer-aided manu-**

**facture (CAM).** The computers are programmed to control or detect things such as: a) cooking temperature and time; b) changes in weight or temperature; c) the speed the products move along a conveyor belt; d) the amount of flavouring added to a product, for example crisps.

Information is constantly sent back to a control centre, where any necessary adjustments to the production of the food product will be made.

Successful food production on a large scale depends on: a) careful control of each stage of production; b) regular inspection and maintenance of equipment; c) well-trained operators.

Equipment used to produce food on a **small scale**, as in the home or smaller catering kitchens, carry out a variety of processes. Many are operated by modern technology, for example microwave ovens, conventional cookers and food processors.

Successful food production on a small scale depend on: a) the skills of the people preparing and cooking the food; b) the ability to use equipment confidently, safely and efficiently; c) having knowledge and understanding of how different foods react when they are prepared and cooked.

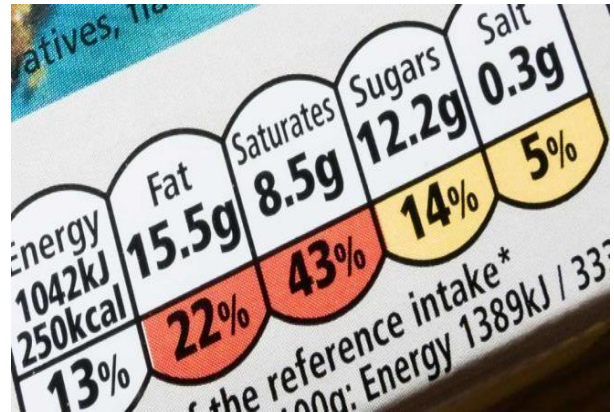
### **Choosing suitable equipment**

Here are some general guidelines for choosing equipment. These apply to all food production, however large- or small-scale it is.

- Choose the best affordable quality.
- Choose items that are easy and safe to operate.
- Choose items that can be used for a variety of processes, if possible.
- Choose equipment that can be cleaned easily and thoroughly.
- Choose items that come with a manufacturer's guarantee and are designed and made to a high safety standard.

## Food Labelling

Most foods are sold in packaging, with a label giving **information** about the product inside. Some of the information has to be shown by law. Some is shown voluntarily by the food producer to attract consumers to buy the product.



Food labels *should*: a) give consumers correct information so that they can choose between foods and understand what they are buying; b) be honest by giving correct information about the product; c) be clearly set out and easy to understand.

Food labels *should not* mislead consumers about: a) what the food product is made from; b) where the ingredients come from and how they were produced; c) what size the product is; d) how the product was made; e) how long the food product will be safe to eat.

Food labelling is controlled by laws in different countries and by the European Union (EU). These laws apply to all food products that are made for sale to consumers and caterers. The laws do not apply to food that is eaten where it is bought. However, all places where people buy food to eat have to display a notice saying which foods they sell contain genetically modified (GM) ingredients.

The information that *must* be put on the label:

1. The **name** of the food product.
2. The **amount** of the food product in the package shown as grams (g), millilitres (ml) or litres (l); or as a number of items, e.g. '5 apricot and nut cereal bars'.

A letter 'e' means that the average weight of a pack must be accurate (agreed by the EU), but the weight of each pack may vary slightly.

3. A **date mark** to safeguard consumers against eating unfit food. There are different date marks for:

**Perishable foods**, which are only safe to eat for a few days, and less

than one month, have to show a sell by or display until date and must also give a use by or eat by date.

Foods with a **shelf-life** of up to 12 weeks have to show a best before day, month and year date mark.

Foods with a shelf-life of more than 12 weeks have to show a best before month and year date mark.

(Both of the above best before date marks may have BBE and then a date printed. This means best before the end of the day, month, or year printed – so a bottle of lemonade, for example, that says BBE Jan 2002, unopened, will remain safe to use until January 31 2001.)

4. A list of **ingredients**, including any additives that have been used. These are listed in descending order of weight – i.e. the heaviest or greatest amount will be written first and the smallest, last. From February 2000, the amount of each ingredient also had to be included in this list. If water is added to a product and makes up more than 5% of the final weight, it must be included in the list. Some foods do not have to show a list of ingredients, e.g. fresh fruit and vegetables and single ingredient foods, e.g. sugar.

5. The **place of origin**.

6. Advice on **storing, preparing** and **cooking** the food product.

7. The **name** and **address** of the **food manufacturer, packager** and **importer**.

Here are some other things you often see on food labels:

- a **bar code** so that the product can be identified by the computer. Companies use this technology to identify: a) the price, size, colour, flavour; b) where and when the product was made (batch number); c) how much of it has been sold; d) from which shop it was sold;

- a **serving suggestion** (usually a picture to give the customer some ideas);

- **symbols** or **logos** to show whether the product is suitable for a particular diet or occasion, e.g. vegetarians, a barbecue, a low-fat diet.

## **Nutrition labelling**

Many people try to look after their health by eating well and therefore like to know what is in the food they buy. Food manufacturers usually try to help people to eat healthily by giving information on the label about the nutrients in their products.

At present, nutrition labelling is voluntary in the EU, but if such information is given, it has to be written in a particular way. The only time that nutrition labelling *has* to be given is when the manufacturer makes a claim about a product, for example

‘\_this product is low in fat and sugar‘ or ‘\_suitable for babies under 6 months‘ or ‘\_suitable for diabetics‘.

There are computer programmes available that work out the nutritional value of different foods and recipes. The results can be presented as graphs, tables or charts.

Some programmes also show the percentage of the recommended daily intake that each nutrient in the product provides.

There are different ways of presenting nutrient information. All nutrient labels *have* to show the amounts of nutrients in 100g or 100ml of the product, and may also show how much there is in a serving.

## **Food packaging**

In the modern supermarket, the food is displayed and sold in a variety of packaging materials, including different types of plastic. In the old shop, the main packaging materials are metal and cardboard; many other products would have been sold loose, and weighed and wrapped for each customer.

The growth of packaging technology – particularly the development of plastics – has enabled food manufacturers to increase the number of foods sold in packaged form. Packaging not only protects a product from damage, but also protects its shelflife by slowing down or preventing natural decay and spoiling by micro-organisms.



## The advantages of food packaging

Food packaging: a) keeps many foods fresh for longer because it prevents them from drying out, going ‘soggy’, being exposed to dirt, dust and flies, or going ‘off’; b) reduces the amount of food that is wasted, by keeping it in good condition for longer; c) stops smells, colours, liquids, oils, or flavours transferring from one food to another when they are stored close together; d) is convenient for consumers, who can quickly choose what they want from supermarket shelves, transport the food home without spoiling it, and store and use the food easily; e) is convenient for manufacturers and retailers who can print information on it, and transport and display foods easily.

## The disadvantages of food packaging

Food packaging: a) can sometimes be difficult to open and use, especially by



people who have weak hands and figures; b) produces much household waste, which has to be disposed of, and not all of which is biodegradable; c) uses up resources such as oil,

trees and energy, which are needed to produce it; d) is sometimes unnecessary, for example individually wrapped chocolate biscuits, which are wrapped in units of 6, then wrapped again to make a packet of 12; e) increases the cost of the product; f) increases the amount of litter that is dropped by people.

## Producing batches

Food products are made in both **large-** and **small-scale** production systems. Large-scale systems operate in factories that **mass-produce** large quantities of the same food product at a time, for example sliced bread, biscuits, sweets, pies, cakes, ice lollies and canned fruits. The production is usually controlled by computers, which are operated by a few workers. The computers control all the production pro-

cesses, for example, weighing, cutting, time and speed of mixing, cooking, cooling and packaging.

Small-scale systems operate from smaller industrial units, shops or private homes, either producing **batches** of the same product, or specially designed single products, for example celebration cakes. **Batch production** is usually carried out by people, using their hands and some manufacturing aids such as mixing and cutting tools and machinery, measuring equipment (for example, electronic scales, temperature probes, measuring spoons), specially shaped moulds and ready-made packaging.

### **Designing food products for batch production**

When designing food products for batch production, these guidelines should be followed:

- The specification for each product should be easy to follow, with the criteria clearly set out, for example: how much of each ingredient it should contain, for how long it should be mixed, the minimum size the final product should be, and so on.
- Health and safety regulations must be carefully followed.
- Test batches of the product should be made and packaged in batches, for example: do all items in the batch cook evenly; do they all come out the same size; and do they stay in one piece when packed?
- Products should be trialled and feedback from customers should be collected to find out whether it is necessary to make any modifications to the product.

### **Making food products in batches**

To make sure that the individual food products in each batch are as similar to each other and of as good a quality as possible, these guidelines should be followed:

- Ingredients should be weighed accurately.
- The method of manufacture should be exactly the same each time, for example: length of time and speed of mixing, amount of mixture used for each product, cooking temperature and time. Equipment should be regularly checked to see that it is working accurately.

- Workers should be well trained and skilled at handling food.
- Finished products should be regularly checked for quality and accuracy of manufacture, for example: are they all the same size, weight, colour and flavour?
- Strict food hygiene rules should be followed to make sure that the finished products are safe to eat.
- For each product, a hazard analysis should be carried out to identify and control health and safety risks that might arise during production.

### **The cost of batch-produced products**

A food manufacturer has to work out the cost of producing an item before deciding how much to sell it for. The individual items that have to be included in the calculation of the cost are called **overheads**. Overheads include: a) costs of ingredients and packaging; b) costs of storing ingredients; c) heating, lighting and delivery fuel costs; d) workers' wages; e) costs of running the building, for example: rent, business rates, removal of rubbish, supply of water; f) costs of maintaining and replacing equipment; g) cost of cleaning equipment and materials; h) cost of faulty or damaged products that can't be sold.

### **Developing new products**

New food products are constantly being designed and developed. In the past, most products were hand-crafted, and the amount made was limited by the time, energy and resources that an individual craft worker had available. Today, most products are made in factories using mass-production processes, and designers have more materials, ingredients, technologies, scientific knowledge and information available to help them design suitable products.

The driving force behind the design and development of new products comes from:

- What consumers **need** and **want**.
- The development of **new technologies** as knowledge and awareness increases and changes.

When new products are being developed, the designer must take into account a number of issues, for example:

- There may be a wide range of possibilities they can consider, for example, what flavours to use for soups, and it may take some careful market research to decide which ones should be developed.
- Human capabilities and limitations, for example: how much strength is required to open a package, or how much of a carbonated drink the average person is able to drink from a can.
- The resources that are available, for example: money, materials, energy supply, ingredients, workers.
- People's needs and wants, which may change over time, and may vary in different areas of the country or world.
- If the product is to be exported to other countries, the designer must make sure that it is acceptable and will not cause offence, for example: because of an ingredient it contains, the design of the packaging or the name it has been given.

### **Roles of professional designers**

There are many different types of career in design. For the food industry, these include:

<b>food product designer</b>	designing new recipes and specifications for individual products and groups of products
<b>industrial designer</b>	designing machinery and food-processing systems for food manufacture
<b>graphic designer</b>	designing packaging and advertising material for food products
<b>food technologist</b>	designing new ways of manufacturing products, for example cook-chill for ready meals; ingredients, for example artificial flavourings; processing techniques, for example bubble technology to make products like icecream have a lighter texture, or blending oils and fats to make new types of spreads
<b>retail designer</b>	designing the internal layouts of, for example, supermarkets and restaurants, including planning the colour schemes and decorations used, and the most efficient way of serving customers

## Lifestyle, culture and product design



Designers have to be aware of changing trends in lifestyle and the influence of these, and of different cultures, on what people choose to eat. People travel abroad more frequently than they did in the past, which has led to an increase in the number of food products and places to eat that are based on different cultures and lifestyles.

Some cultures have distinctive ways of preparing and cooking foods, for example, many Mexican foods have a hot chilli flavour, while American foods tend to be sweet, and Indian foods spicy. Foods can be used to express the relationships between people, for example, in some cultures, the most powerful individuals have the first and best choice of foods. Foods are also used to celebrate important occasions, for example holy days, weddings and ceremonies such as Bar Mitzvahs.

Lifestyles and cultural habits tend to change over time. Modern Western cultures have in recent years emphasized the harm that food can do to health; for example, by eating too much fat and sugar, people can develop heart disease and cancer. This has led to the design of products with lower fat and sugar contents, to cater for people who are concerned about their food intake.

At the same time, food culture has been greatly influenced by the American fast-food style of eating. These products often have a high fat and sugar content. Designers have also developed products to cater for this style of eating, and for the increasing trend for eating snack foods instead of large meals.

### Selecting ingredients

Surveys and questionnaires are frequently used in market research to find out:

- a) what people think about something;
- b) what people know about something;
- c) what people like and dislike;
- d) what is available for people to use or buy.

Surveys are useful because they provide information about: a) how well a food product is selling; b) what types of food product sell well in certain areas or types of shop; c) what products are bought by certain groups of people; d) what type of packaging, flavouring, size, colour, etc., is most popular for a food product; e) what other food manufacturers and retailers are producing and selling.

Questionnaires are useful because they provide information about: a) why people buy certain products; b) why they shop for food at certain times and places; c) what their needs and wants for food products are; d) whether a food product or shop meets their needs and wants; e) what type of food product they would like to be able to buy.

### **Sampling food products**

#### **Sensory analysis**

'Analysis' means to look at and study something closely, in order to understand: a) what it is made of; b) how it works; c) how it affects other things; d) how it could be changed or improved.

In **sensory analysis**, the senses of sight, touch, smell, taste and hearing are used for this purpose.

When food products are analysed, the **analyst** will use sensory analysis to study: a) the appearance, texture, aroma, flavour and sound of a product; b) the effect that altering in the product has on what people think about it; c) how one food product compares with another similar product, for example, for flavour, appearance, image and quality.

Food manufacturers employ trained testers to:

- Try samples of food products.
- Write down their opinions of those food products by using words to describe something about them, for example, the texture of a bread roll could be described as: *chewy, crusty, dry, floury, heavy, or spongy*; the flavour of an orange drink could be described as *acid, tangy, fruity, bitter or sour*.

- Rate the food product on a **scale**, for example: *most liked – least liked, saltiest – least salty, smoothest – least smooth*.

- Compare one food product with others for particular characteristics, for example moistness, oiliness, hardness, chewiness.
- Describe their likes and dislikes about a product, for example, *lovely*, *re-volving*. These types of word are called **hedonic descriptors**.
- Describe what they feel and believe about a product, for example, that it is *healthy*, *natural*, *traditional*, or *artificial*. These types of word are called **attitudinal descriptors**.

You can carry out food sampling tests quite easily, to find out what people think of your food products. Here are some tips to follow when carrying out any food sampling tests:

- The more people you ask to take part in your test, the more useful your results will be. The descriptions of tests below tell you the minimum number of people you should ask.
- Always give each food sample a **code number**, which only you should know. In this way, the opinion or description your testers give will not be influenced by knowing what they are tasting.
- Don't give out the samples in a particular order – muddle them up, so that the testers do not try all the samples in the same order as each other.
- Always include a **control sample**.
- Give the testers a glass of water to drink between tasting each sample, to clear their taste buds and mouth before they try the next one.

## **Designing for markets**

### **Production systems**

Food products are made in a **production system**. Production systems have three parts:

**Input.** What goes in, for example, ingredients, packaging and energy.

**Process.** What comes out, i.e. how the product is made.

**Output.** What comes out, i.e. the finished product and any waste or unused materials.

Many food products are made all year round, in very large numbers, so that consumers can buy them often. This is called **‘mass’** or **‘high-volume’** production.

Some food products are made only at certain times of the year, in smaller numbers, for example at Christmas time, or are designed and made for individual customers, for example celebration cakes. This is called **‘one-off’** production.

High-volume production has to be carefully researched and designed so that:

a) each finished product is the same as all the others; b) each product is produced in a safe and clean way; c) all the ingredients needed are available throughout the year.

One-off production has to be carefully researched and designed so that: a) it meets the specific needs and requirements of the customer, so that expensive mistakes are avoided; b) just enough products are made, so that not too many are left over and have to be sold at a loss.

As more of a product is made, and fewer people are involved in the manufacture, the less it costs to produce each individual item. Customers generally expect to pay less for high-volume products than one-off products, which require more time and people to produce.

### **Designing a product**

Once a manufacturer has carried out market research and decided that a new product is needed, the final design can be started. Manufacturers often use computer-aided design (CAD) to make this process simpler and more efficient.

The design must include *how* the product will be made, i.e.:

- what machinery will be required
- how the mixture will be made
- how it will be cut/shaped/rolled out/mixed, etc.
- how it will be cooked/chilled/preserved
- how it will be packaged and stored
- how it will be distributed
- how the product will be kept safe while it is being made



CAD can be used to work out some of these factors, for example, the design of a cutting or shaping machine, the way products pass through an oven to be cooked, or the way the packaging is put on.

### **Manufacturing processes**

Manufacturers often use computer-aided manufacture (CAM) to make highvolume products. CAM uses special electronic **sensors**, which collect information about each product (for example, weight, temperature, colour, texture) as it is being made. This information is sent back to a computer, which then sends instructions back to the production line, for example, to cool this product, add more product, or cook for longer. Information that is sent and used in this way is called **feedback**.

### **Quality assurance and quality control**

When people buy a food product, they need to feel confident that the product is safe and of a good quality. **Quality assurance** is a type of promise or guarantee that the manufacturer makes to the consumer that the product is: a) safe to eat; b) made to a particular standard; c) well designed; d) honestly produced and described on the label; e) suitable for the purpose it was designed for.

**Quality control** is a method used by the manufacturer when they design a product, to make sure that the product does not fall below the standard required. As the product is designed, each stage is examined so that any problems that could arise can be corrected to avoid hazards or expensive and wasteful mistakes, and to check that the product meets the specification.

HACCP (Hazard Analysis of Critical Control Points) is the name given to an important type of quality control that is used in all parts of the food industry, for example, farms, restaurants, shops, factories and distribution companies. It aims to ensure that food products are made, stored and transported as safely and hygienically as possible.

They types of hazard that could occur when food products are made, stored or transported include:

- the growth of food-poisoning bacteria in the food, in the food preparation area or on equipment

- items falling into the food, for example from the machinery
- packaging or storage faults allowing micro-organisms to enter and grow in the food
- invasion of the premises or equipment by pests, for example cockroaches or rats
- slippery floor surfaces in food premises, which put workers in danger
- pollution of water, air or the local environment by chemicals, rubbish or waste materials
- poor hygiene habits of people who handle the food

The environmental health department of the local council will want to make sure that food businesses have carried out a HACCP, and will regularly check that they are closely monitoring each stage of their business, in order to protect the consumer from unsafe food or practices.

### Buying food

Most food is bought in **supermarkets**. There are several different supermarket companies in the UK, but four well-known ones – Tesco, Asda, Sainsbury's – sell most of the food in the country. Supermarkets sell thousands of different food products, and aim to offer consumers lots of choice. Out-of-town **superstores** have become very popular and offer lots of other goods and services besides food, including banking, petrol, dry-cleaning and garden goods. People also buy food from:

- open-air markets;
- farm shops and farmers' markets;
- small, independent supermarkets;
- specialist shops, for example fishmongers and bakeries;
- box schemes that deliver food, for example fruit and vegetables, to your door;
- home delivery schemes operated by supermarkets via the Internet.



### **Where do retailers buy their food?**

Large retail companies, for example supermarkets, often buy food direct from **farmers** and **producers**. They make a contract with the farmer or producer, who has to have the food ready at a certain time for the retailer to sell. Retailers ask for the food to be produced to a set standard, for example a particular size, colour, shape or ripeness. Farmers and producers often also package and label the food for the retailer.

Retailers also buy from food **manufacturers**. They buy either directly from the manufacturer or from a **wholesaler**. Wholesalers buy food from manufacturers and sell it on to retailers from large warehouses.

Retailers buy foods from all over the world so that their customers can have foods that are out of season, for example strawberries only grow in the UK in the summer, but can be bought from other countries for the rest of the year. Many foods travel thousands of kilometres before they arrive in the shops. Most food is sent to retailers in lorries, from central **distribution centres**.

### **How do retailers know how much food to buy?**

Almost all food products have a bar code on their label. Each bar code represents a number, which is unique to the food product on which it is printed. The bar code number is programmed into a computer, and is read by a laser scanner at the checkout.

For each food retailer, the computers in the supermarkets are linked to central computers at the Head Office. Every time a food product is sold in a supermarket, the information from the bar code is recorded. At the Head Office, the computers record how much of every food product each supermarket sells. This information goes out to distribution centres, which use it to keep each supermarket supplied with food products as it sells them.

Making sure that supermarkets are supplied with products as they need them is called stock control. Computer technology has helped retailers to do this more easily and accurately. Sometimes the information goes directly to manufacturers, who supply the supermarkets directly from the factory, with stock including bakery products, milk and dairy products.

### **Where do manufacturers buy their foods?**

Large manufacturers often own farms, plantations and orchards and control what, when and how food is produced. They often buy **components** for food products from other manufacturers, for example flavouring, packaging, sugar, fats and cake icings. Like retailers, they may have contracts with the farmers and producers who supply them with foods. Some manufacturers produce, manufacture and sell food products directly from their farms, for example cheese, yogurt and ice cream.

### **Food retailers**

Food retailers are responsible for: a) putting perishable and frozen products into chiller cabinets and freezers in the shop as soon as possible after they have been delivered; b) storing perishable foods safely, for example raw foods separate from cooked foods; c) stock rotation; d) maintaining freezers and chiller cabinets so that they stay at safe temperatures; e) taking out-of-date products off the shelves; f) storing non-food products, for example washing powders and scented soaps, away from food products; g) storing products safely so consumers don't hurt themselves when taking them off the shelves; h) storing products correctly so that they do not get damaged by other products or people; i) keeping the warehouse, storage and display areas clean and tidy.

### **Consumers and caterers**

Consumers and caterers are responsible for: a) taking food purchases home quickly, and putting perishable products into the refrigerator or freezer straight away; b) making sure that their refrigerator and freezer are working at a safe temperature; c) following the manufacturer's and retailer's instructions for storing different foods; d) eating or serving foods before the 'use by' and 'best before' dates run out; e) storing perishable foods safely, for example, keeping raw and cooked foods separate, preventing raw foods from dripping onto others, removing dirt from salads before refrigerating; f) using up older products before new ones.

### **„Best before“ and „use by“ dates**

„Use by“ dates are for perishable foods, which should be used by the date shown, otherwise they may not be safe to eat.

„Best before“ dates are for less perishable foods. They may also have a number in brackets, for example 17<sup>th</sup> May (4), which means that four days before the date, the product will be removed from the shelves, but will be safe to eat for another four days.

„Best before end“ dates are for long-life products, which should be used before the last day of the month shown.

### **Working in a group or team**

It is very common for several people to work together on a project, as a team. The team will be made up of people with different skills and expertise, which they use to complete different parts of the project. Sometimes, people from other organizations or countries may be asked to help with the project, for example as an adviser, or try out a product and evaluate it.

#### **Designing and developing a new food product**

To design and develop a new food product, the following groups of people might be involved:

A **project coordinator/team leader** to organize other people, delegate tasks, and bring the whole project together once it is finished.

**Market researchers** to find out what people want and like.

**Product designers** to design and develop the new product.

**Marketing and advertising experts** to promote the new product.

**Food technologists** to make a new product to the design specification and test

## PART V

### GRAMMAR REVISION

#### Неопределенные местоимения *some, any*

Неопределенные местоимения *some, any* обычно определяют существительное, часто заменяя артикль. Как правило, *some* употребляется в утвердительных предложениях со значением: *какой-нибудь, несколько, некоторые, немного* или *приблизительно, около*. *Any*, как правило, употребляется в вопросительных предложениях со значением *какие-нибудь, сколько-нибудь*. В утвердительных предложениях *any* имеет значение *любой, всякий, каждый*.

**Examples:** *some* crops – *некоторые культуры*, *some* nutrients – *несколько питательных веществ*, *any* food – *какая-нибудь пища*, *any* feed – *любой корм*

#### **Put in *some* or *any*. Translate the sentences into Russian:**

1. There are ... new varieties of potato in which farmers are especially interested.
2. The farmer does not use ... additional workers on his farm.
3. It is important for ... farmer to provide his animals with valuable feeds.
4. Are there ... ruminant animals suitable for this area?
  5. ... herbivorous animals such as cows and goats can convert grasses into milk.
  6. They raise ... breeds of dairy cattle but there are not ... beef cattle on his farm.
7. Are there ... draft animals on this farm?
8. We don't have ... horses there.
9. These crops need ... nitrogen.
10. These animals don't need ... additional feeds in their rations.
11. It is necessary for ... farmer to have ... knowledge in farm management.
12. Do you know ... exotic animals?
13. ... type of manure increases the yields of crops.
14. Are there... new departments at our Academy?

15. There is ... work at ... time on a farm.

16. – Do they have ... work now? – No, they don't have ... . 17. There isn't ... manure on our fields.

### Количественные местоимения *much, little, many, few*

*Many* много и *few* мало употребляются с исчисляемыми именами существительными. *Much* много и *little* мало употребляются с неисчисляемыми именами существительными.

*A few* означает несколько (употребляется с исчисляемыми именами существительными), а *a little* – немного (употребляется с неисчисляемыми именами существительными).

*Examples: many* tractors – много тракторов; *few* cars – мало автомобилей; *much* oil – много масла; *little* air – мало воздуха; *a few* farms – несколько ферм; *a little* time – немного времени.

### Put in *much, many, few, little, a few, a little*. Translate into Russian:

1. How ... sheep are there in the picture?
2. In ... poor African countries farmers are still using cows as draft animals.
3. We don't have ... money, so we can't repair the old dairy machines.
4. It is necessary to buy ... feed for our cattle.
5. ... experiments have been conducted with laboratory animals.
6. ... cats and dogs are kept in isolated buildings.
7. Dogs serve humans in ... ways. 8. Today only ... people still believe that black cats are unlucky.

### Основные формы английского глагола

Infinitive	Past Form	Participle I	Participle II
<i>to open to speak</i>	<i>opened spoke</i>	<i>opening speaking</i>	<i>opened spoken</i>

## Видо-временные формы глагола в действительном залоге

Время	Форма глагола	Пример	Наречия времени
Present Simple	Инфинитив без частицы <i>to</i> (в 3-м лице – окончание <i>-s</i> )	I/You/We/They <i>pay/read</i> He/She/It <i>pays/reads</i>	always, usually, regularly, often, seldom, sometimes, every day/ week/month/year
Past Simple	Форма прошедшего времени	I/You/We/They He/She/It <i>paid/read</i>	yesterday, last week, two years ago, in 2006
Future Simple	<i>shall/will</i> + инфинитив без частицы <i>“to”</i>	I /We <i>shall/will pay/read</i> I/You/He/She/It/ We/They <i>will pay/read</i>	tomorrow, next year, in three weeks, in the future, in 2030
Present Continuous	<i>am/is/are</i> + Participle I	I <i>am paying/ reading</i> He/She/It <i>is pay- ing/reading</i> You/We/They <i>are paying/reading</i>	now, at the moment, at present, nowadays
Past Continuous	<i>was/were</i> + Participle I	I <i>was paying/ reading</i> He/She/It <i>was pay- ing/reading</i> You/We/They <i>were paying/reading</i>	when he came/ yesterday at 12/ last Sunday at 6/ when the telephone rang
Present Perfect	<i>have/has</i> + Participle II	I/You/We/They <i>have paid/read</i> He/She/It <i>has paid/read</i>	ever, never, just, already, yet, today this week/month/ year, lately, recently, since, for
Past Perfect	<i>had</i> + Participle II	I/You/We/They <i>had paid/read</i> He/She/It <i>had paid/read</i>	before/ after/ by/ when
Future Perfect	<i>shall/will have</i> + Participle II	I /We <i>shall/will have paid/read</i> He/She/It/You/They <i>will have paid/read</i>	by 7 p.m. tomorrow/ when you come

**NOTE!** В придаточных предложениях времени и условия после союзов *if, when, after, before, till/until, as soon as* будущее время не употребляется: **Future Simple** заменяется **Present Simple**. На русский язык все переводится в будущем времени.

**Example:** *If they make some more experiments tomorrow, they will finish* this work earlier.

– Если они сделают еще несколько опытов завтра, то закончат работу раньше.



**I. Use the correct form of the verb in brackets in the active voice.**

**Translate the sentences into Russian:**

1. In early times people (to begin) domesticating wild animals.
2. I think the farmer (to increase) the yields of crops next year.
3. The scientists from our laboratory (to present) interesting reports at the conference recently.
4. Last year the farmers (not to rely) on feeds from pastures and (to grow) additional crops for their livestock.
5. The cow (convert) large quantities of different grasses into milk which (to be) a valuable product.
6. As our agronomist (to recommend) we (to spread) manure on this field now.
7. People (to keep) domesticated animals either in barns or on pastures.
8. The production of dairy products constantly (to increase) in Russia at present.
9. What animals (to use) people as draft animals in the 18<sup>th</sup> century?
10. For many centuries people in Africa (to breed) camels, but even now a white camel (to be) an exotic animal.
11. Last week the farmers (to keep) swine on pastures.
12. Poultry also (to convert) feed efficiently into protein and (to provide) people with meat and eggs.
13. If any species in the food chain (to disappear), there (to be) a disbalance in the whole ecosystem.
14. As soon as the environment of a species or a population (to develop) in an unfavourable way, it (to cause) an ecological crisis.
15. If ecologists (not/to make) soil and water analyses, they (not/to be able) to estimate the environmental pollution.

**II. Translate the sentences into Russian. Pay attention to different forms of the verbs:**

1. Farmers didn't know much about nutrients in the 17<sup>th</sup> century.
2. After Columbus had discovered America he brought some new varieties of plants to Europa.
3. In 1870 Pavlov entered the University of St. Petersburg, where he studied chemistry and physiology.
4. The milk yields have fallen and some animals have become sick.
5. Scientists are going to continue their research in the field of animal nutrition.
6. Nowadays farmers are trying to satisfy the people's requirements in highly nutritive products.
7. In the past, farmers had much difficulty in feeding cattle during the winter season.
8. Two centuries ago farmers used their own practical experience to satisfy animals with feeds.
9. Farmers often produce high-quality butter and cream from milk.
10. Farmers will rely on the record of an individual animal's ancestors.
11. Chemical genetics remains a basis for all other topics in genetics.
12. At present farmers are using different breeding programmes to improve their herds.
13. They will have returned before you come home.
14. Before the dog attacks a potential enemy, it will show signs of hostility.
15. Recently, several organizations have established conservation programmes for endangered domestic breeds of cattle, sheep and swine.
16. When the weather is rainy, windy and cold, cattle will decrease the grazing time and drink little water.
17. Many naturalists have studied aspects of animal behaviour through the centuries.
16. In 1949 Frisch established that bees use the sun as a compass.

17. Poor preventive measures have resulted in a rapid spread of infection among sheep.

18. If farmers apply modern cultivation practices, yields of forage crops will be higher.

### Видо-временные формы глагола в страдательном залоге

Страдательный залог (*The Passive Voice*) употребляется, когда лицо или предмет подвергается действию извне.

Страдательный залог образуется при помощи глагола “*to be*” в соответствующем времени и причастия прошедшего времени (*Participle II*) смыслового глагола. Время, лицо и число определяется вспомогательным глаголом “*to be*”.

Время	Пример
Present Simple	I <i>am</i> <i>given</i>
	He/She/It <i>is</i>
	You/We/They <i>are</i> <i>asked</i>
Past Simple	/He/She/It <i>was</i> <i>given</i>
	You/We/They <i>were</i> <i>asked</i>
Future Simple	I/We <i>shall be</i> <i>given</i>
	He/She/It/You/We/They <i>will be</i> <i>asked</i>
Present Continuous	I <i>am being</i> <i>given</i>
	He/She/It <i>is being</i> <i>asked</i>
	You/We/They <i>are being</i>
Past Continuous	I /He/She/It <i>was being</i> <i>given</i>
	You/ We/They <i>were being</i> <i>asked</i>
Present Perfect	I/You/We/They <i>have been</i> <i>given</i>
	He/She/It <i>has been</i> <i>asked</i>
Past Perfect	I/You/We/They <i>had been</i> <i>given</i>
	He/She/It <i>had been</i> <i>asked</i>
Future Perfect	I/ We <i>shall have been</i> <i>given</i>
	He/She/It/You/They <i>will have been</i> <i>asked</i>

**Examples:** The professor *was asked* about the problems of agriculture. -

Профессора спросили о проблемах сельского хозяйства.

The students of our group *will be given* the pictures of different cars. –

Студентам нашей группы дадут изображения разных автомобилей.

## Особенности употребления страдательного залога в английском языке

Часто в страдательном залоге употребляются глаголы с предлогами. Вот некоторые из них:

<i>to account for to agree on (upon) to deal with to insist on to listen to to look at to look after to look for to object to to refer to to rely on (upon) to speak of (about) to send for to think of</i>	отвечать (нести ответственность) за договариваться о иметь дело с; рассматривать ч-л настаивать на слушать к-л, ч-л смотреть на заботиться о искать ч-л, к-л возражать, протестовать ссылаться на полагаться на говорить о посылать за думать о
<i>to wait for to pay attention to</i>	ждать ч-л, к-л обращать внимание на

На русский язык такие предложения переводятся неопределенно личными предложениями, а перевод следует начинать с предлога.

*Examples:* The problem of atomic energy use *is* often *spoken about* by our scientists. – О проблеме использования атомной энергии часто говорят наши ученые.

This lecturer *is* always *listened to* with great attention. – Этого лектора всегда слушают с большим вниманием.

*Has the engineer been sent for?* - За инженером послали?

**I. Translate the sentences into Russian. Pay attention to the Passive Voice:**

1. Any changes in animal feeding will be agreed on with the vet tomorrow
2. Yesterday the specialist in animal nutrition was asked to give some recommendations and he was listened to with great attention.
3. The young farmer has been already given some advice how to look after the cows during the winter period.
4. At the moment the plan for farm reconstruction is being discussed.
5. Some essential nutrients cannot be manufactured within the cell in the body of animals.

6. Human nutrition has been improved as a result of animal nutrition investigations.
7. The question how to influence the animal productivity at the genetic level has not been answered yet.
8. Calves are looked after properly, so they grew rapidly.
9. Sometimes water is referred to as the most essential substance for normal growth of animals.
10. Many specialists have been already invited to take part in the agricultural exhibition.
11. The introduction of modern machinery in agriculture was followed by the increase in food production.
12. The latest discoveries in the field of physiology were spoken much of by the scientists at the conference.
13. The most important characteristics of a particular horse are usually relied on while choosing the animal for racing.
14. The quality of cow's milk is influenced by the composition of the diet.
15. All animal feeds may be classified into two large groups: concentrates and roughages.
16. Most of the time was spent on the analysis of the physiological data.
17. New crops will be grown on our farm next year.

**II. Translate the following sentences into Russian:**

1. Animals are bred for utility, sport, pleasure and research.
2. The planning of mating combinations was introduced in practice.
3. Much effort is being made to study the possibilities of utilizing agricultural and industrial waste in the nutrition of farm animals.
4. If animal manure is utilized for feed nutrients, some pollution problems will be solved.
5. Horses are being bred for sport.

6. The most significant progress in animal breeding has been done with dairy cattle.
7. It is necessary to examine young males that will be used for breeding.
8. When poultry and swine are kept in confinement, their manure will be collected, recovered and used for refeeding to cattle.
9. Ecology is widely studied as one of the most important aspects of biology.
10. Animals should be examined by veterinary surgeons regularly.
11. If a sick animal cannot be cured, it will have to be slaughtered.
12. The government officials must be informed by a farmer about the outbreak of a notifiable disease.
13. Human health may be influenced by certain animal diseases.
14. At present, different breeding programmes are being used by farmers to improve their herds.

**Степени сравнения прилагательных и наречий**  
(The degrees of comparison of adjectives and adverbs)

Положительная степень прилагательного/наречия	Сравнительная степень прилагательного/наречия	Превосходная степень прилагательного/наречия
<i>big early</i>	<i>bigger earlier</i>	<i>the biggest the earliest</i>
<i>difficult quickly</i>	<i>more/less difficult more/less quickly</i>	<i>the most/least difficult most/least quickly</i>
<i>good bad</i>	<i>better worse</i>	<i>the best the worst</i>
<i>many/much little far</i>	<i>more less farther/further</i>	<i>the most the least the farthest/furthest</i>

1. Союз *as ... as* так же ... как, такой же ... как употребляется при сравнении двух одинаковых предметов или действий. Союз *not so ... as* не такой ... как употребляется, когда один из сравниваемых предметов уступает другому по степени своего качества или свойства. Сравнительная конструкция *the ... the* перед прилагательным или наречием в сравнительной степени переводится на русский язык союзом *чем ... тем*. Союз *than* переводится на русский язык как союз *чем*.

**Examples:** This room is *as* light *as* that room. – Эта комната такая же светлая, как и та.

The results of the latest experiments are *not so* interesting *as* the previous ones. – Результаты последних экспериментов не такие интересные, как предыдущие.

**The better** farm animals are fed, **the longer** is their life productivity. – Чем лучше животных кормят, тем продолжительнее период их продуктивности.

**I. Use the correct form of the adjective or adverb in brackets. Translate the sentences into Russian:** 1. Mother's milk is (good) feed for calves and lambs.

2. The northern regions of Russia are (little) suitable for crop farming than the central regions.

3. The mechanization of agriculture in some African countries is (bad) than in Asian countries.

4. It was (easy) to cultivate this new field than the farmer had thought.

5. Nowadays we use (modern) machinery than ten years ago.

6. Some cattle breeds require (hot) climate for growth than others.

7. Farmers are interested in (cheap) fertilizers of (high) quality.

**II. Fill the gaps with *as ... as; not so ... as; the ... the*. Translate the sentences into Russian:**

1. ... better animal physiological functions are studied, ... sooner scientists can control them for practical purposes.

2. The nutritional value of this feed is ... high ... farmers have expected.

3. Minerals are ... important to normal growth and development of animals ... proteins.

4. Chemical analyses were ... developed in the 19<sup>th</sup> century ... nowadays.

5. ... richer animal rations are in succulents, ... greater is the problem of digestive troubles.

6. Roughages are ... easily digestible ... concentrates.
7. ... better is the quality of feeds, ... higher is the animal productivity.
8. For ruminants fibre is ... important ... protein in daily rations.
9. ... more natural feeds are consumed by animals, ... better they develop.

### Модальные глаголы (Modal Verbs)

Модальные глаголы *must, can, may* употребляются в сочетании с инфинитивом смыслового глагола без частицы **to**. Они не обозначают действия, а выражают отношение говорящего к действию, выраженного инфинитивом смыслового глагола.

Глагол *must* выражает необходимость, долженствование или вероятность совершения действия.

Глагол *can* выражает возможность, физическую или умственную, способность совершения действия.

Глагол *may* выражает разрешение, а также возможность, вероятность совершения действия.

*Examples:* You *must measure* the water level. – Вы должны измерить уровень воды.

We *can cool* the engine by water from the radiator. – Мы можем охладить двигатель водой из радиатора.

You *may take* my jack and lift the car. – Вы можете взять мой домкрат и поднять машину.

**Эквиваленты модальных глаголов.** Наряду с *must* и взамен его недостающих форм употребляется глагол *to have + Infinitive*.

Эквивалентом глагола *can* является глагол *to be able (to)*.

Для глагола *may* в значении разрешения используется его эквивалент *to be allowed to*.

*Examples:* I *had to stay* at the laboratory two hours more to complete the work. – Мне пришлось остаться в лаборатории еще на два часа, чтобы закончить работу.



Farmers *are not able to control* the epidemic in the region. – Фермеры не могут сдержать распространение эпидемии в регионе.

We *shall be allowed to go* home earlier. – Нам разрешат пойти домой раньше.

**Глагол *to be* в модальном значении.** Для выражения долженствования, необходимости, обусловленной договоренностью, заранее намеченным планом, приказом и т.п., употребляется глагол *to be + Infinitive*.

*Example:* We *are to consult* a specialist when the apparatus fails. – Мы должны консультироваться со специалистом, когда прибор не работает.

**Модальные глаголы *ought to* и *should*.** В качестве модальных глаголов употребляются также глаголы *ought to* и *should*. Глагол *ought to* употребляется для выражения модального долга или совета, относящегося к настоящему или будущему времени.

Глагол *should* выражает более слабую степень долженствования (по сравнению с *must*) и переводится *следует, надлежит*.

*Example:* You *ought to start* testing the computer. – Тебе следует начать проверку компьютера.

The driver *should cool* the engine if he wants to start it again. – Водителю следует охладить двигатель, если он хочет завести его вновь.

## **I. Translate the sentences into Russian paying attention to the Modal Verbs:**

1. A farmer must separate a sick animal immediately from the other animals in the herd.

2. A national breeding association is to publish the official record of the pedigree of purebred horses and dogs every year.

3. During the recent decades some species of animals had to move to new places and adapt to new environment conditions.

4. All animals and birds which are imported from foreign countries must be under severe quarantine for some period of time to prevent the introduction of any infections.

5. Scientists ought to carry out many experiments before the animal cloning may become a routine procedure in the breeding of farm animals.

6. If the weather is windy and rainy hill sheep and cattle will have to stop grazing to look for grounds and shelter.

7. According to the agreement with a farmer, a veterinary surgeon is to examine farm animals regularly.

8. Livestock often eat forage and other food sources that humans are not able to eat, and convert them to types of food that humans can consume.

9. In order to maintain animals in healthy condition, each farmer must follow certain sanitary requirements.

10. During the Ice Age in order to survive, animals had to adapt to colder environmental conditions.

11. Some symptoms such as high temperature or fever may be noticed even by a non-specialist.

## **II. Translate the following sentences into Russian:**

1. The results of experiments on animal behavior are to be analysed on the basis of scientific knowledge.

2. Certain animal diseases may greatly influence our health.

3. Preventive medicine should have considered the aspects of disease prevention and control.

4. The problems of the bird flu were to attract many scientists to take part in the conference.

5. Carriers of animal infectious diseases can be easily transmitted by water and soil.

6. Mammalian livestock may be used as a source of milk.

7. Special laboratory tests must be done in order to find out the cause of a disease.
8. Calves and lambs should be provided with high-quality protein feeds.
9. One should remember that the teeth of the pig don't provide conditions for very fine grinding.
10. Healthy lambs can withstand bad weather, provided the coat dries immediately after birth.
11. Ewes should be healthy and vigorous.
12. The foal is able to digest its food and absorb the food nutrients much more rapidly than other farm stock.

### **Инфинитив (The Infinitive)**

Инфинитив – основная глагольная форма, от которой образуются все личные формы глагола во всех группах времен в действительном и страдательном залогах.

#### **Формы инфинитива**

	Indefinite	Continuous	Perfect	Perfect Continuous
Active	<i>to help</i>	<i>to be helping</i>	<i>to have helped</i>	<i>to have been helping</i>
			<i>helped</i>	<i>helping</i>
Passive	<i>to be helped</i>	–	<i>to have been helped</i>	–

**Функции инфинитива.** Инфинитив может выполнять функции подлежащего, дополнения, обстоятельства, определения, а также может быть именной частью сказуемого.

*Examples: To operate* the new crane is not easy. – Управлять новым краном нелегко.

He likes *to get up* early. – Ему нравится рано вставать.

The aim of the conference *is to exchange* experience of work. – Цель конференции – обменяться опытом работы.

**To provide** the workers with comfortable flats many new houses are to be built in our town. – Чтобы обеспечить рабочих удобными квартирами, много новых домов должно быть построено в нашем городе.

We stopped for a minute (in order) **to have** a rest. – Мы остановились на минутку, чтобы отдохнуть.

He was looking for a car **to buy**. – Он искал автомобиль, который можно купить.

**Инфинитивная конструкция с предлогом “for”** переводится на русский язык придаточным предложением с союзом «чтобы» («для того чтобы»), подлежащим которого становится существительное, а сказуемым – инфинитив, который переводится глаголом в прошедшем времени.

**Examples: For animals to grow and develop** rapidly, a farmer should provide the due care and feeding. – Чтобы животные росли и развивались быстро, фермер должен обеспечить соответствующий уход и кормление.

**Объектный инфинитивный оборот (The Objective Infinitive Construction)** состоит из существительного в объектном падеже или личного местоимения в объектном падеже и инфинитива. Употребляется после глаголов: **to want** - хотеть, **to wish** - желать, **to require** - требовать, **to suppose** - полагать, **to assume** – полагать, считать, **to believe** – полагать, считать, **to think** - думать, **to expect** - ожидать, **to consider** – считать, полагать, **to know** - знать, **to find** – находить и др. После глаголов **to see** - видеть, **to watch** - наблюдать, **to hear** - слышать, **to feel** - чувствовать, **to make** - заставлять и др. инфинитив употребляется без частицы “to”.

**Examples: The scientist consider this phenomenon to be important.** – Ученый считает это явление важным.

We saw them **complete** their research work. – Мы видели, как они закончили свою исследовательскую работу.

**Субъектный инфинитивный оборот (The Subjunctive Infinitive Construction)** состоит из существительного (местоимения) в именительном падеже

в функции подлежащего и инфинитива в качестве части составного глагольного сказуемого.

В данной конструкции употребляются глаголы *to know, to say, to believe, to suppose, to consider, to think, to find, to assume, to report* и т.д. в страдательном залоге.

**Examples:** He *is known to make* his report today. – Известно, что он делает доклад сегодня.

They *are supposed to begin* their research in a few days. – Предполагают, что они начнут исследование через несколько дней.

С глаголами *to seem* – по-видимому, казаться, *to appear* – по-видимому, казаться, *to happen* – случаться, *to prove* – оказываться, *to turn out* – оказываться, а также с сочетаниями *to be likely* – вероятно, *to be unlikely* – маловероятно, вряд ли, *to be sure* – точно, наверняка, *to be certain* – точно, наверняка субъектный инфинитивный оборот употребляется в действительном залоге.

**Examples:** This method *proved to be* a new one. – Оказалось, что это новый метод.

This type of fuel *is likely to be* very cheap. – Это топливо, вероятно, очень дешевое.

**I. Translate the following sentences into Russian:**

1. To raise sheep in semiarid or arid regions, farmers choose sheep breeds welladapted to such conditions.

2. In order to maintain high-milk yields, milking cows are to be fed nutritious feeds.

3. To fatten cattle is a common practice on farms where beef cattle are bred.

4. For the beef cows to have some rest and be ready for the next calving, the calves should be weaned at eight to ten months of age.

5. For geese to fatten well, they should be fed grain for the last six weeks.

6. Farmers have found the method of fattening pigs on concentrates to be the most efficient one.

7. Scientists think severe exploitation of some fish species to result in their extinction in some years.

8. Sheep breeders believe sheep without any folds to be more desirable for wool production.

9. Many people consider duck eggs to possess strong taste and do not like eating them.

10. The entire length of this farm is supposed to be about twenty miles. 11. Interbreeding was found to improve the dominant trait in the breed.

12. Pavlov I.P. proved to be a distinguished physiologist of the 19th century.

13. The Moscovy duck seem to be the ancestor of all domestic ducks.

14. Crayfish are sure to be prized for its tail meat.

15. Bees are certain to be the most important pollinating insects.

16. Columbus is believed to have brought wild pigs to North America.

17. The horses are supposed to have been first used by a tribe of Indo-European origin.

18. Eggs to be used for hatching should be incubated not later than 10 days after collection.

19. In some areas pastures are too scarce to provide animals with sufficient amount of feed.

20. The water in the pond is not fresh enough to be used for watering the cattle.

21. The raw milk to be drunk by little children should be boiled.

22. Our cow produces too much milk for the calf to consume it.

**II. Translate the following sentences into Russian paying attention to the Infinitive and the Infinitive Constructions:**

1. To be most effective the sunlight must be direct.

2. To get their essential nourishing fuel, mammals, like other vertebrates, have to perform a whole series of complicated operations.
3. The unused residue returns to the soil as manure to enrich the food supply on which future generations may feed.
4. Copper is known to be the activator of certain enzyme systems.
5. The pig is believed to be the world's second largest provider of meat known as pork.
6. To prevent meats from being contaminated by harmful bacteria, producers widely used vacuum-packing.
7. Fermentation is supposed to have been an ancient form of food preservation used in the meat industry.
8. Meat is considered to be an essential part of human diet.
9. Milk is known to be highly nutritious food that has been used by humans since the beginning of recorded time.
10. This boar is not vigorous enough to be used for mating.
11. The lamb is not fat enough to be slaughtered this month.
12. Ecologists have found a lot of bird species to be disappearing at a rapid rate now.
13. Beekeeping is believed to have originated in the Middle East.
14. These geese do not seem to have attracted the attention of genetics.
15. The goat proved to be an important milk producer in China and India.
16. Dairymen know buffalo's milk to be produced in commercial quantities in some countries.
17. Cow milk has been found to contain about 3.5 to 5 per cent fat.
18. Scientists consider sweet taste of milk to be due to lactose.
19. Dairy products are likely to be the best dietary source of calcium.
20. The milk to be sold commercially should be fortified with vitamin D.
21. Pasteurized milk to be kept refrigerated in closed containers may remain consumable for 14 days.
22. Sour cream is known to be made from cream.

23. Cheese is sure to be an important component of a balanced diet.
24. Nutritionists think cheese to be a concentrated source of almost all the valuable nutrients found in milk.

### Причастие (The Participle)

Причастие – неличная форма глагола, обладающая свойствами глагола, прилагательного и наречия. Причастие I образуется от формы инфинитива прибавлением суффикса – *ing*. При переводе на русский язык причастию I соответствует причастие с окончанием *-щий* или деепричастие с окончанием *-я*.

Причастие II стандартных глаголов образуется от формы инфинитива прибавлением суффикса *-ed*, а причастие II нестандартных глаголов приводится в соответствующих таблицах. На русский язык переводится причастиями с окончаниями *-ный, -мый, -тый*.

Существуют простые и сложные формы причастия.

	Active	Passive
Participle I	<i>finishing</i>	<i>being finished</i>
Participle II	–	<i>finished</i>
Perfect Participle	<i>having finished</i>	<i>having been finished</i>

**Examples:** The driver oils the *moving* parts of the machine carefully. –

Машинист тщательно смазывает движущиеся части машин.

The mechanic *examining* the new machine tool works at this plant. –

Механик, осматривающий новый станок, работает на этом заводе.

**Having gone** into chemical reactions elements entirely changed their properties. – Вступив в химические реакции, элементы полностью изменили свои свойства.

Do you see the *loaded* cars on the second track? – Видите ли вы нагруженные вагоны на втором пути?

Electronic computers *being used* now may be found in all branches of industry.



– Электронно-вычислительные машины, используемые сейчас, можно найти во всех отраслях промышленности.

*Having been given* all the instructions, the designer was able to start his work immediately. – После того как конструктору дали все указания, он сразу же мог начать свою работу.

Независимый причастный оборот (*The Absolute Participle Construction*) переводится на русский язык:

1) придаточным обстоятельственным предложением времени или причины с союзами *так как, когда, если, после того как*;

2) самостоятельным предложением (бессоюзным или с союзами *причем, при этом, а, и, но*), если причастный оборот стоит в конце предложения.

Независимый причастный оборот можно узнать в тексте по следующим формальным признакам: 1) независимый причастный оборот всегда отделен запятой, 2) перед причастием стоит существительное или местоимение в именительном падеже.

*Examples: The circuit being broken*, the magnetic field disappears. – Если цепь прерывается, магнитное поле исчезает.

*An automatic machine sorting* the letters, the post office's services are much easier to perform. – Так как письма сортирует машина-автомат, то производить почтовые операции намного легче.

The article deals with metals, *most of them being excellent conductors*. –

Статья посвящена металлам, причем большинство из них – превосходные проводники.

### **I. Translate the following word-combinations with Participle I and Participle II into Russian:**

varying conditions; grown sheep; feeds used; growing pigs; examined cattle; increasing needs; used terms; suffering animals; results obtained; domesticated mammals; nutrients consumed; raising cattle, farmers ...; developing countries; bulls sold; investigating this problem, the scientists ...; investigated problem

**II. Translate the sentences into Russian paying attention to the Participle:**

1. The methods recommended should help to control the spread of the disease.
2. Some investigated animal physiological processes are similar to human processes.
3. Knowing the nutritive value of feed supplements a farmer can provide his animals with rations accurately calculated.
4. The calf growing on a pasture will be healthier than that kept in a barn.
5. Only animal products satisfying all the necessary veterinarian standards can be sold in the market.
6. Keeping the records about the dates of artificial insemination of cows, a farmer will know the date of calving for each animal.
7. Being raised for mutton, sheep can be also sheared in order to obtain some wool.
8. Having been raised under severe conditions in mountains, lambs seemed to be healthier than the ones raised in the sheep-pen.
9. Being rich in such nutrients as essential amino acids, meat is highly valued as human food.
10. Having become more concerned about our diet, we began to eat more poultry, fish and fresh fruit and vegetables and fewer eggs and less pork.
11. Being obtained from different kind of animals, meats are usually classified by the type of animal.
12. Producers dealing with meat processing have already succeeded in new technologies having been introduced in order to satisfy the increasing demand for their products.

### **III. Translate the sentences with the Absolute Participle Construction into**

#### **Russian:**

1. Nearly all sheep breeds of mutton type having originated in England, the breed names were taken from the names of English countries.
2. Foals being weaned from the dam, they should not be able to see, hear or smell their dams again.
3. Modern agriculture having become highly mechanized, farm managers must possess a good technical knowledge to operate various farm machines.
4. The records having been kept accurately, the farmer is provided with all the necessary information.
5. Management has always been an important factor in operation of a farm, its role increasing nowadays.
6. The planning process having been completed, the farmer was able to choose the best alternative and put it into operation.
7. The income is considered to be the difference between the profit and the costs, the income being calculated for a definite time interval.
8. The statement of cash flows represents the sources and the use of the farm funds for operating activities, the data about additional financial support being included in it as well.

### **IV. Translate the following sentences into Russian:**

1. Raising cattle, farmers should turn animals out on pastures as early as possible in spring.
2. Dairy cattle are susceptible to all the diseases and infections affecting beef cattle.
3. A balanced ration is the one consisting of several nutrients in proper proportions.
4. Propolis is a substance possessing antibacterial properties.
5. An other problem facing beekeepers is loss of forage due to habitat destruction by humans.

6. The leading honey exporters are China, Argentina, Mexico, while the leading importers are Germany, the United States and Japan.
7. Being obtained from different kinds of animals, meats are often classified by the type of animal.
8. The most widely consumed meat is beef.
9. Preserving meat, it is necessary to control spoilage by inhibiting the growth of microorganisms.
10. While stored for a long time, meat products may be subjected to the influence of many factors changing their quality and safety.
11. Due to the temperature being decreased under 3°C , one can prevent pathogenic bacteria from growing.
12. Being frozen rapidly, meat maintains its quality.
13. Meat being rich in amino acids, it is highly valued as human food.
14. Having increased the percentage of fat in a meat cut, it is possible to decline the percentage of water.
15. Programmes of agricultural diversifications have been carried out by some developing countries, the government acting as a kind of national farm manager.
16. Farms operating with large amounts of borrowed capital, financial statements may be of great importance for farm management.
17. Cows being leased, the owner of the cows may be a contracting firm, a local bank or an individual investor.
18. The world's agriculture involves millions of farmers managing their resources in different ways, the efficiency of production resulting from technological possibilities and social and political conditions.

### **Герундий (The Gerund)**

Герундий – неличная форма глагола, сочетающая в себе свойства глагола и свойства существительного.

## Формы герундия

	Active	Passive
Indefinite	<i>loading</i>	<i>being loaded</i>
Perfect	<i>having loaded</i>	<i>having been loaded</i>

Герундий употребляется после глаголов:

*to avoid* – избегать; *to consider* – рассматривать; *to finish* – заканчивать; *to involve* – включать; *to prevent* – предотвращать; *to stop* – останавливать; *to suggest* – предполагать и др.; а также после глаголов с предлогами:

*to agree to* – соглашаться на; *to be interested in* – интересоваться ч-л; *to concentrate on* – сосредоточиться на; *to depend on* – зависеть от; *to insist on* – настаивать на; *to involve in* – вовлекать в; *to object to* – возражать против; *to prevent from* – предотвращать; *to succeed in* – преуспевать в; *to rely on* – полагаться на; *to result in* – приводить к

**Examples:** My brother thinks of *entering* the post-graduate courses next year.

– Мой брат думает поступить в аспирантуру в следующем году.

Farmers are interested in *using* new fields. – Фермеры заинтересованы в использовании новых полей.

Many scientists spent their life in *trying* to solve this difficult problem. –

Многие ученые потратили свои жизни на решение этой трудной проблемы.

Without *knowing* the words you can't translate the text. – Не зная слов, нельзя перевести текст.

**Сложные формы герундия.** Герундиальный оборот с предшествующим притяжательным местоимением или существительным в притяжательном падеже обычно переводится на русский язык придаточным предложением с союзами *что, чтобы, то что, того что, в том что*.

**Examples:** We knew nothing of his *being appointed* to a new job. – Мы ничего не знали о том, что его назначили на новую должность.

We heard of their *having continued* to look for oil and gas in new areas. – Мы слышали, что они продолжают искать нефть и газ в новых районах.

**I. Translate the following sentences into Russian:**

1. Before choosing cows for mating, breeders should estimate the performance of their progeny.
2. Raising and feeding cattle on pasture throughout the year is the most economical method.
3. This book deals with the planning of mating combinations.
4. The recording of individual performance in breeding populations of farm animals developed rapidly in 1970s.
5. Crossbreeding is a very popular method for increasing sheep population.
6. For centuries pigs have been used for obtaining edible fat and meat.
7. Both biologists and chemists are interested in developing new drugs for treating farm animals.
8. Large litters greatly depend on proper selecting of a sow.
9. By changing feeding rations of animals, one can improve the quality of farm products.
10. The shelf life of dried milk products was extended due to their having been dried less than three per cent moisture.

**II. Translate the following sentences into Russian paying attention to the Gerund:**

1. Besides possessing hair and producing milk, mammals also have a number of other internal characteristics.
2. Whitewashing the walls helps in maintaining sanitation.
3. Because of the covering of wool sheep can withstand cold temperatures better than cattle.
4. If shearing is delayed too long, the wool becomes dead and lifeless.
5. Frozen silage must be thawed before feeding.
6. Beekeepers earn their living from selling the honey and beeswax their hives produce.
7. What temperature do the bees stop flying at?

8. Winter is a good time for looking through the previous year's records and planning next year's campaign.
9. One more commonly used method of meat preservation is canning.
10. Renting or leasing land enables farmers to operate on a much larger scale.
11. Future agricultural progress depends on improving the quality of management.

### Условные предложения (*Conditional Sentences*)

Условные предложения в английском языке наиболее часто вводятся союзами *if* если; *unless* если не; *provided (that)* если, при условии что и др.

Условные предложения делятся на три типа: 1) реальные, 2) нереальные (маловероятные), относящиеся к настоящему или будущему времени; 3) нереальные, относящиеся к прошедшему времени.

1) Реальные условные предложения (I типа) обычно относятся к будущему времени и переводятся изъявительным наклонением, причем глагол – сказуемое в придаточном предложении употребляется в Present Simple, а в главном предложении – в форме Future Simple. На русский язык оба глагола переводятся в будущем времени.

**Example:** The driver *will stop* the train if he *sees* some obstacle on the track. –

Водитель остановит поезд, если он увидит препятствие на пути.

2) Предложения II типа выражают маловероятное условие, т.е. предположение, относящееся к настоящему или будущему времени. На русский язык переводятся с глаголом в сослагательном наклонении с частицей *бы*. В английском языке в главном предложении употребляется глагол *should* или *would* с инфинитивом, а в условном придаточном предложении глаголсказуемое употребляется в форме Past Simple.

**Example:** The driver *would stop* the train if he *saw* some obstacle on the track. –

Водитель остановил бы поезд, если бы увидел препятствие на пути.

3) Для выражения нереального условия, относящегося к прошедшему времени, используются формы сослагательного наклонения III типа. В английском языке в главном предложении употребляется глагол *should* или *would* с перфектным инфинитивом, а в условном придаточном предложении глагол-сказуемое употребляется в форме *Past Perfect*.

**Example:** The engineer *would not have made* the mistake if he *had used* the correct formula. – Инженер не сделал бы ошибки, если бы он применил правильную формулу.

В условных предложениях II и III типа союзы *if, unless, provided that* могут быть опущены, если в придаточном предложении имеются глаголы *were, had, could, might* или *should*. В данном случае имеет место инверсия (обратный порядок слов). При переводе на русский язык союз употребляется.

**Examples:** *Had* he *attended* all the lectures, he *would have passed* all the examinations. – Если бы он посещал все лекции, он бы сдал все экзамены. *Were* the computer in order, we *would use* it for making calculations needed for our research. – Если бы вычислительная машина была исправна, мы использовали бы ее для вычислений, необходимых для наших исследований.

**I. Translate the following sentences into Russian:**

1. If cold milk is given to new-born calves, it will cause digestible troubles.
2. Unless there had been achievements in genetics, it would not be possible to improve cattle breeds.
3. Provided a farmer had raised sheep both for mutton and wool he would have increased the efficiency of his farm.
4. If the farmer used a purebred sire for breeding, he would improve his livestock.
5. If it had not been a large commercial farm, a farm manager wouldn't have negotiated on the discount for animals feeds.
6. Provided livestock records were organized in the table form, it would save time in preparing various financial statements.



7. Young piglets may gain rapidly and reach the market faster provided they are supplied with all necessary feeds.

8. If farmer were provided with the required information concerning feeds and farm implements, one could expect him to make proper management decisions.

9. If we had considered the data concerning the number of pigs and their weight, we should have calculated the expected income.

**II. Translate the following sentences into Russian paying attention to the Conditional Sentences:**

1. Unless there had been achievements in genetics, it would not be possible to improve cattle breeds.

2. If cold milk were given to new-born calves, it would cause digestive troubles.

3. The bull would be provided with better feeding if it were to be used for breeding.

4. If the plan were developed for one farm it would not be satisfactory for another.

5. Provided the manager did not consider all the facts, he would not be able to analyze and estimate his resources.

6. If a farmer had borrowed some additional money to buy new equipment the uses of the funds at a given periods during the year would have been recorded in a cash-flow statement.

7. Unless there were certain changes in crops and livestock it would not have been possible to increase agricultural productivity.

**III. Set your imagination free and complete the sentences:**

1. If I had a chance to work abroad, I ...

2. If I were invited to the international conference, I ...

3. If I were a very rich person, I ...

4. If I were a vegetarian, I ...

5. If I were a famous scientist, I ...
6. If I had a chance to visit any country, I ...
7. If I were appointed the farm manager, I ...

## ***LEXICAL – GRAMMAR TESTS***

### **Text 1**

**Прочитайте текст и выберите правильные варианты ответа:**

All over the world people are changing the face of the planet. Wild areas are created for farming and new cities. As well as transforming the environment, we are destroying habitats, the homes of ... (1) plants and animals.

Living things have evolved ... (2) millions of years. Many animals and plants can only ... (3) in certain environments. When such areas are destroyed, wildlife cannot always ... (4) to the new conditions and some species may die out. Thousands of species of plants and animals face extinction because of human activities.

People can also ... (5) from habitat destruction. When forests are cut down earth is washed away, this causes crop failure and starvation. Plants provide essential food and can also be used in medicines. If species ... (6) extinct, their potential value will never be known.

1. a) both      b) each      c) every      d) either
2. a) for        b) in        c) during    d) since
3. a) persist    b) survive   c) go        d) attend
4. a) adapt     b) use      c) stand     d) bear
5. a) feel       b) suffer    c) damage   d) experience
6. a) get        b) die       c) become   d) resul

## Test 2

### I. Выберите правильный вариант:

1. A breed may be defined as a group of ... developed for a special function.
- a) people
  - b) animals
  - c) farmers
2. I watched my dog ... with her puppies.
- a) played
  - b) playing
  - c) to play
  - d) have been played
3. Dairy cattle breeds are kept primarily for ... ..
- a) beef production
  - b) milk production
  - c) wool production
4. Hormones are proteins that regulate ... .
- a) body organs and their function
  - b) minerals
  - c) body cells
5. The farmers said they ... the horses.
- a) feed
  - b) are feeding
  - c) had fed
6. Salmon swim hundreds of miles to lay their....
- a) eggs
  - b) tails
  - c) fins
  - d) gills

7. Most animals obtain an adequate supply of iron in their normal ....
- a) life
  - b) food
  - c) pasture
8. There is a relationship between animal feeding and animal ....
- a) health
  - b) breeds
  - c) disease
  - d) behavior
9. Gorillas ... their young for several years.
- a) look in
  - b) look at
  - c) look after
10. Many species of fish ... sounds which help them communicate with each other.
- a) have produced
  - b) producing
  - c) producer
  - d) produce

### Text 3

**Прочитайте текст и выберите правильные варианты ответа:**

Malaria is one of the most common .... (1) diseases in the world. So far the only kind of ... (2) implemented by the affected countries has been distributing mosquito nets and basic medicines. ... (3) and doctors have been working on a malaria vaccine for many years. However, although all vaccines produced so far have shown good results on monkeys their ... (4) in tests on humans was far less ... (5). Research on the malaria vaccine arouses ... (6) interest in Africa, Asian and South America countries, where malaria is ... (7) a most dangerous disease causing ... (8) loss of life and ... (9) problems. Everybody is then ... (10) waiting for good news about ... (11) trails of a new medicine as the future costs of malaria spreading are indeed ... (12). **scientists; prevention; patiently; economical; infectious; impressive; considerable; successful; really; predicative; patients“; effectiveness**

## Test 4

**Прочитайте текст и заполните пропуски соответствующими словами, приведенными ниже:**

A dominant dog has the potential to be a dangerous dog. The last thing you want is a dangerous dog, so you must deal ... (1) dominance in a dog quickly and effectively, ... (2) the dog could be a danger to your family or other people.

Some people believe that only large dogs that are dominant are a problem. A large dog obviously has more power and the ... (3) to cause more harm, however even a small dog can do quite a bit of ... (4) to a child or another small animal. So no matter the size of the dog, dominance is an ... (5) that must be dealt with immediately.

If you are not sure whether your dog is a dominant one or not, there are some ... (6) for which to watch. One of the earliest to spot is that the dog tries to take control of every situation. He will be naturally competitive, prone to taking risks and just assertive in general. More subtle ... (7) of dog dominance, however, may be things like demanding to be petted or snatching food.

- |    |            |            |            |                 |
|----|------------|------------|------------|-----------------|
| 1. | a) at      | b) in      | c) with    | d) for          |
| 2. | a) another | b) unless  | c) others  | d) otherwise    |
| 3. | a) acting  | b) ability | c) absence | d) availability |
| 4. | a) damage  | b) hazard  | c) message | d) problem      |
| 5. | a) aisle   | b) exit    | c) issue   | d) isles        |
| 6. | a) cases   | b) claws   | c) claims  | d) clues        |
| 7. | a) excuses | b) paws    | c) teeth   | d) examples     |

## Test 5

**Прочитайте пять небольших высказываний (5-7 мин.). Установите соответствие между каждым высказыванием и утверждениями 1 - 7. Какие два утверждения лишние?**

1. The Groom Room was recently opened especially for pets. The four-legged feeders will be served beef tar-tar with carrots and asparagus, carpaccio from chicken breast, turkey meatballs, meat salad, Napoleon dog's cake and other pet delicacies.

The price of a dog's dinner depends on the breed of the dog and its size. Not to be forgotten the café also offers lunch for animal owners shaped into dog and cat faces.

2. A lot of pets now have beauty salons, and many of them offer better service than those for people. The dog's salon *Richi* offers grooming for various breeds and size. Washing and drying small dogs runs from 20 to 50 dollars. Cleaning teeth, ears, eyes and claws will hit your wallet for 5-10 dollars. The longer hair the pet has the more money you will pay for haircuts.

3. The American Animal Hospital Association offers 24-hour emergency service so you must remember that we are always here for your pets in case of emergency. Our hospital complies with the association's high veterinary care standards. This is our way of ensuring that our client's pets receive the best care we can offer.

4. There is nothing more joyful than playing with your dog. Well, there is a place where your dog can have its freedom to run around and meet other dogs as well. It is called Dog Beach. Dog Beach is the original dog beach and one of the most popular places to take your pet. The whole place is leash-free. Of course, you need to remember to clean up after your dog.

5. Pets Market is the largest independent pet supplies store in the West Coast of Scotland. Your pet is dear for you whether it is a cat, dog, fish, hamster, pig, snake, ferret, spider or any other animal. Pets Market has all the information that you need for your pet. Pet rabbits and pet goats information is provided as well as about feeding pet parrots and caring for freshwater aquariums. Our prices are reasonable and notable for their diversity.

1. This place might be dangerous for your pet.
2. You can make your pet prettier here.
3. You can buy a pet here.
4. You can get your pet treated here.
5. You can take you pet for a walk here.
6. You can leave your pet at this place for some weeks.
7. You can get your pet fed at this place.

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