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**ВВЕДЕНИЕ**

Настоящее учебное пособие адресовано студентам очного и заочного отделения специальности 1-74 03 03 «Промышленное рыбоводство», оно также может использоваться на занятиях с магистрантами. Цель пособия – сформировать у студентов лексические навыки чтения текстов по специальности. Пособие поможет усвоить ключевые лексические единицы (термины и терминологические словосочетания), характерные для языка специалистов-рыбоводов, а также повторить и систематизировать некоторые лексико-грамматические структуры, наиболее часто употребляемые в речи научного стиля.

Учебное пособие состоит из 14 разделов, включающих тексты и упражнения к ним. Тексты, с помощью которых вводится новая лексика, представляют собой неадаптированные, несколько сокращенные словарные статьи из World Book Encyclopedia. В них содержатся разнообразные сведения о значении рыб для человека, о видах рыб, их образе жизни, строении тела, органах чувств, способах питания, адаптации к окружающей среде, размножении и т. д. Таким образом, тексты позволяют комплексно представить термины соответствующей области знаний.

Пособие предназначено главным образом для работы на уроке, поэтому тексты в каждом разделе разбиты на абзацы, после которых следуют вопросы. Студентам рекомендуется читать тексты вслух за преподавателем. Это важно для формирования слухо-моторных образов слов и конструкций. Ответы же на вопросы обеспечивают повторение и первоначальное закрепление лексических единиц в соответствующем грамматическом и стилистическом контексте.

Для снятия трудностей работы с текстом многие слова и словосочетания, вынесенные в предтекстовые упражнения и поурочный словарь, снабжены транскрипцией и переводом. В конце пособия приводится два словника (список названий рыб и морских животных и список наиболее важных терминов и терминологических сочетаний), которые облегчают работу студентов и преподавателей.

Закрепление, активизация и контроль усвоения нового лексического материала осуществляется с помощью системы послетекстовых упражнений. К упражнениям, обозначенным звездочкой, приводятся ключи.

**UNIT 1.**

**INTRODUCTION**

**1.1. Before reading the text practise the pronunciation of the following words and learn them.**

**vertebrate**, *pl*. **vertebrates** [´vз:tıbr(e)ıt] – (*зоол*.) позвоночное, позвоночные

**whale** [´weıl] – кит

**shark** [´∫a:k] – акула

**to weigh** [´weı] – весить, иметь вес

**aquatic** [ ə´kwætık] – водный

**poisonous** [´pɔız(ə)nəs ] – ядовитый

**feature** [´fıt∫ə] – особенность, характерная черта

**gills** [´gılz] – жабры

**fin** [´fın] – плавник

**porpoise** [´pɔ:pəs] – (*зоол.*) морская свинья, бурый дельфин

**1.2. Read the text and answer the questions after each paragraph.**

Fish are vertebrates (**backboned animals**) that live in water. There are more kinds of fish than all other kinds of water and land vertebrates put together. The various kinds of fish differ so greatly in shape, colour, and size that it is hard to believe they all belong to the same group of animals. For example, some fish look like **lumpy** rocks, and others like **wriggly** **worms**. Some fish are nearly as **flat** as pancakes, and others can blow themselves up like balloons. Fish have all the colours of the **rainbow**. Many have colours as bright as the most brightly coloured birds. Their rich reds, yellows, blues, and purples form hundreds of beautiful **patterns**, from stripes and **lacelike** designs to **polka dots**.

1. *How do various kinds of fish differ from each other?*
2. *What can fish look like?*
3. *What colour are fish?*

The smallest fish is the *Trimmaton nanus*, a **goby** of the Indian Ocean, which grows to about 2/5 inch (1 centimetre) long. The largest fish is the whale shark, which may grow more than 40 feet (12 meters) long and weigh over 15 short tons (14 metric tons). It feeds on tiny, drifting aquatic organisms called plankton and is completely **harmless** to most other fish and to human beings. The most dangerous fish weigh only a few pounds or kilograms. They include the **deadly** **stonefish**, whose poisonous **spines** can kill a human being in minutes.

1. *What is the size of the smallest fish?*
2. *What fish is the largest?*
3. *What is plankton?*
4. *Is the whale shark dangerous to people?*
5. *Why is the stonefish the most dangerous?*

Fish live almost anywhere there is water. They are found in the near-freezing waters of the Arctic and in the steaming waters of tropical jungles. They live in roaring mountain streams and in quiet underground rivers. Some fish make long journeys across the ocean. Others spend most of their life buried in sand on the **bottom** of the ocean. Most fish never leave water. Yet some fish are able **to survive** for months in **dried-up** **riverbeds**.

1. *Where can fish live?*
2. *Can fish live without water?*

Fish have enormous importance to human beings. They provide food for millions of people. Fishing enthusiasts catch them for sport, and people keep them as pets. In addition, fish are important in the balance of nature. They eat plants and animals and, in turn, become food for plants and animals. Fish thus help keep in balance the total number of plants and animals on the earth.

*11. Why are fish important to people?*

*12. What is the role of fish in the balance of nature?*

All fish have two main features in common. (1) They have a backbone, and so they are vertebrates. (2) They breathe mainly by means of gills. Nearly all fish are also cold-blooded animals – that is, they cannot regulate their body temperature, which changes with the temperature of their surroundings. In addition, almost all fish have fins, which they use for swimming. All other water animals differ from fish in at least one of these ways. Dolphins, porpoises, and whales look like fish and have a backbone and fins, but they are mammals (animals that feed their young with the mother's milk). Mammals breathe with lungs rather than gills. They are also warm-blooded--their body temperature remains about the same when the air or water temperature changes. Some water animals are called fish, but they do not have a backbone and so are not fish. These animals include **jellyfish** and starfish. **Clams**, crabs, **lobsters**, **oysters**, **scallops**, and **shrimps** are called **shellfish**. But they also lack a backbone.

*13. What are the main features of all fish?*

*14. How are mammals different from fish?*

*15. What is the difference between cold-blooded and warm-blooded animals?*

*16. What water animals belong to mammals?*

*17. Why are jellyfish, starfish and shellfish not fish?*

**VOCABULARY**

**backbone** – спинной хребет, позвоночник

**backboned animals** – позвоночные животные

**lumpy** – комковатый, бугорчатый

**wriggly [´**riɡli**]** – извивающийся, извилистый

**worm** – червяк

**flat** – плоский

**rainbow** – радуга

**pattern** – рисунок, узор

**lace** – кружево; **lacelike** – ‘кружевоподобный’, как кружево

**polka dots** – в горошек, в крапинку

**goby** – (*зоол.*) бычок

**harm** – вред; **harmful** – вредный; **harmless** – безвредный

**deadly** – смертельный, смертоносный

**stonefish –** (*зоол.*) бородавчатка

**spine** – шип, игла, колючка

**bottom** – дно

**to survive** – выжить

**dried-up riverbed** – высохшее русло реки

**jellyfish** – медуза

**clam** – (съедобный) моллюск

**lobster** – омар, рак

**oyster** – устрица

**scallop** – (*зоол*) гребешок, створчатая раковина

**shrimp** – шримс, мелкая креветка

**shellfish** – 1) моллюск, 2) ракообразное

**1.3. Copy these expressions and translate them into Russian.**

1) Various kinds of fish; 2) kinds of vertebrates; 3) to differ from smb/smth in size, shape, colour; 4) to belong to the same group of animals; 5) to look like rock (worms, fish); 6) to grow to about 1 centimetre long; to grow more than 12 metres long; 7) to feed on plankton; to feed smb with milk; 8) to be harmless to human beings; 9) to have enormous importance to human beings; 10) to provide food for people; 11) to become food for plans and animals; 12) to have smth in common; 13) to regulate body temperature; 14) to remain the same; 15) to breathe by means of gills; to breathe with lungs; 16) to have a backbone; to lack a backbone.

**1.4. Give the English equivalents for the following words and word combinations.**

1) Позвоночные животные; 2) различаться по цвету; 3) трудно поверить; 4) плоский как блин; 5) раздуваться как воздушные шары; 6) все цвета радуги; 7) птицы с самым ярким оперением; 8) китовая акула; 9) крошечные, пассивно парящие в воде организмы; 10) абсолютно безвредный; 11) ядовитые шипы; 12) горные ручьи; 13) высохшие русла рек; 14) подземные реки; 15) огромное значение; 16) любители рыбной ловли; 17) млекопитающие; 18) холоднокровные животные / теплокровные животные; 19) плавник; 20) жабры / лёгкие.

**1.5. Remember the following linking words and phrases. Fill in the gaps with the appropriate expression.**

1. **for example** – например
2. **in addition** – кроме того
3. **in turn** – в свою очередь
4. **thus** – таким образом
5. **mainly** – главным образом
6. **by means of** – посредством (чего)
7. **that is** – то есть
8. **at least** – по крайней мере
9. Mammals differ from fish in a number of ways. They feed their young with the mother’s milk. \_\_\_\_\_\_\_, they breathe with lungs rather than gills.
10. Some water animals are called fish, ­­\_\_\_\_\_\_\_, jellyfish, starfish, shellfish, but they lack a backbone and \_\_\_\_\_\_\_ are not fish.
11. Most fish live \_\_\_\_\_\_\_ in water, but some fish are able to survive \_\_\_\_\_\_\_ several months in dried-up riverbeds.
12. Stonefish can kill a human being \_\_\_\_\_\_\_ poisonous spine.
13. Mammals are warm-blooded – \_\_\_\_\_\_\_, their body temperature remains about the same when the temperature of their surroundings changes.
14. Fish feed on plants and animals and, \_\_\_\_\_\_\_, provide food for plants and animals.

## Grammar: Degrees of comparison

**1.6. Complete the table by inserting the missing forms.**

|  |  |  |  |
| --- | --- | --- | --- |
| 1. |  | more |  |
| 2. |  |  | (the) smallest |
| 3. |  |  | (the) largest |
| 4. | little |  |  |
| 5. |  |  | (the) most dangerous |
| 6. |  | longer |  |
| 7. | important |  |  |
| 8. |  | brighter |  |
| 9. | rich |  |  |
| 10. |  | farther |  |

**1.7. Open the brackets using the correct form of the adjective.**

1. Which is (large): the Timmaton nanus or the whale shark?
2. What is the name of the (dangerous) fish?
3. The whale shark is (large) fish.
4. The (small) fish live in the Indian Ocean.
5. The rivers in America are much (big) than those in England.
6. Some fish are as (flat) as pancakes.
7. Some fish are found in the (cold) waters of the Arctic.
8. Dolphins are (small) than whales.
9. Shellfish are not so (tiny) as plankton.

**1.8. Translate the sentences into Russian. Pay attention to the translation of the word 'most'.**

|  |  |
| --- | --- |
| **most** (*n*) – большая часть, наибольшее количество | **most** (*superlative of* much, many) – наибольший, наиболее, самый |
| 1. Some fish spend most of their life buried in sand on the bottom of the ocean.2. Most fish never leave water.3. The whale shark is completely harmless to most other fish. | 1. Many fish have colours as bright as the most brightly coloured birds.2. The most dangerous fish weigh only a few pounds |

**UNIT 2.**

**THE IMPORTANCE OF FISH**

**2.1. Before reading the text learn the following word combinations:**

**to benefit people** – приносить пользу людям

**food fish** – промысловая рыба

**game fish** – непромысловая рыба

**to catch fish commercially** – ловить рыбу промышленным способом

**commercial fishing** – ловля рыбы в промышленных целях (на продажу)

**inland waters** – внутренние воды

**fresh water** – пресная вода

**freshwater fish** – пресноводная рыба

**for fun** – ради забавы / развлечения

**feeding methods** – методы (способы) кормления

**native fish** – аборигенная, местная рыба

**livestock feed** – корм для скота

**bloodthirsty fish** – кровожадная рыба

**2.2. Read the text. Answer the questions after each paragraph.**

Fish benefit people in many ways. Fish **make up** a major part of the people's **diet** in Japan and Norway. In other countries, the people eat fish to add variety to their **meals**. For thousands of years, people have also enjoyed fishing for sport. Many people keep fish as pets. Fish are also important in the balance of nature.

1. *How do fish benefit people?*

**FOOD AND GAME FISH.**

Fish **rank among** the most **nourishing** of all foods. Fish **flesh** contains about as much **protein** as meat does. Each year, millions of tons of **cod**, **herring**, **tuna**, and other ocean food fish are caught commercially. Commercial fishing also takes place in inland waters, where such freshwater food fish as **perch** and **trout** are caught.

1. *Why do fish rank among the most nourishing of all foods?*
2. *What species of food fish are caught commercially?*

Businesses called fish farms **raise** certain types of fish for food. Fish farms in the United States raise **catfish**, **salmon**, and trout. In other countries, they raise **carp** and **milkfish**. Fish farmers raise the fish in **ponds** and use special feeding methods to make the fish grow larger and faster than they grow **in the** **wild**.

1. *What kinds of fish are raised for food on fish farms?*
2. *Where are the fish for food raised?*
3. *Why do fish farmers use special feeding methods?*

Some persons enjoy fishing simply for fun. Many of these people like to go after game fish. Game fish **are noted for** their fighting spirit or some other quality that adds to the excitement of fishing. They include such **giant** ocean fish as **marlin** and **swordfish** and such fresh-water fish as **black bass** and rainbow trout. Most game fish are also food fish.

1. *Why do many people who enjoy fishing like to go after game fish?*

**OTHER USEFUL FISH.**

Certain fish, such as **anchovettas** and **menhaden**, are caught commercially but are not good to eat. Industries **process** these fish to make **glue**, livestock feed, and other products. Scientists often use **goldfish** and other small fish as experimental animals in medical research. They do not require as much space or as much care as do other experimental animals. Some fish produce **substances** used as medicines. For example, a **chemical** produced by **puffers** is used **to treat** **asthma**. Many people enjoy keeping fish as pets in home aquariums. Popular aquarium fish include goldfish, **guppies**, and tetras.

1. *Why are fish not good to eat caught commercially?*
2. *Why do scientists often use fish as experimental animals?*
3. *How else can fish be useful to people?*

**HARMFUL FISH**.

Few species of fish will attack a human being. They include certain sharks, especially **hammerhead** and white sharks, which occasionally attack swimmers. **Barracudas** and **moray eels** may also attack a swimmer if provoked. Certain types of **piranhas** are bloodthirsty fish with **razor-sharp** **teeth**. A group of them can **strip** the flesh from a human being or an alligator or other large animal in minutes or even seconds. Some other fish, including **sting rays** and stonefish, have poisonous spines that can injure or kill anything that comes in contact with them. The flesh of **filefish**, puffers, and some other fish is poisonous and can **cause sickness** or death if eaten.

A few species of fish have become **pests** after being introduced into certain waters. For example, sea **lampreys** that entered the Great Lakes and Asian **catfish** introduced into inland waters of Florida have become **threats** to native fish.

1. *What species of fish can attack swimmers?*
2. *Why are piranhas dangerous?*
3. *Why are sting rays, stonefish, filefish and some other fish harmful?*
4. *Why are native fish of the Great Lakes and inland waters of Florida endangered?*

## VOCABULARY

**to make up** – составлять

**diet** [´daıət] **–** (*зд.*) пища, еда

#### meal – еда

**to rank (among)** – считаться (одним из…)

**nourishing** [´nʌrı∫ıŋ] – питательный

#### flesh – мясо, тело, плоть

**protein** [´prəuti:n] – протеин

**cod** – треска

**herring** – сельдь

**tuna** – голубой тунец

**perch** – окунь

**trout** – форель

**to raise** – разводить, выращивать

**catfish –**  сом, сомовые

**salmon** [´sæmən]– европейский лосось, сёмга

#### carp – карп

**milkfish** – ханос, или «молочная рыба»

**pond** – пруд

**in the wild** – на воле

**to be noted (for smth)** – быть известным (чем-либо)

**giant** [´ʤaiənt] – громадный, гигантский

**marlin** [´ma:lin] **–**  марлинь

**swordfish** [´sɔ:dfi∫] **–** меч-рыба

**black bass** – форелеокунь, семейство центрарховые ( иначе солнечные, или ушастые окуни)

**anchovettas, anchovy** [´ænt∫əvi] – анчоус, хамса, камса

**menhaden** [men´heidn] – менхаден

**to process –** подвергать обработке, обрабатывать, перерабатывать

**glue** – клей

**goldfish –** серебряный карась, тж. золотая рыбка

**substance –** вещество

**chemical** – химическое вещество, химикат

**puffer** [´pʌfə ]– собака-рыба

**to treat** – лечить

**asthma** [´æsmə]– удушье, астма

**guppy** – гуппи

**hammerhead** – молот-рыба

**barracuda** – барракуда, морская щука

**moray eel** [mə(u)´rei] – мурена

**piranha** [pi´ra:njə]– пиранья

**razor-sharp teeth** – острые как лезвие зубы

**to strip** – снять, содрать, очистить

**sting ray** – скат дазиатис

**filefish** – спинорог

**to cause smth** – вызвать что-либо, стать причиной чего-л.

**sickness** – болезнь, заболевание; тошнота

**pest –** вредитель

**lamprey** [´læmpri] – минога

**catfish** – сом, сомовые

**threat (***n.*) – угроза

**2.3. Read the text again and organize all the information about the importance of fish into lists like these below. Give examples of species of fish for each column.**

|  |  |
| --- | --- |
| **Useful fish** | Harmful fish |
| *– to make up a major part of people’s diet;**– to add variety to people’s meals;**– to rank among the most nourishing of all foods;**…* | *– to enjoy fishing for sport (for fun);**…* | *– to make glue, livestock feed and other products;**…* | *–to attack swimmers;**– to be bloodthirsty;**…* |

**2.4. Using the table, explain how certain species of fish benefit people and why some species of fish are harmful.**

**2.5. Make a list of all species of fish, mentioned in the text.**

**Grammar: Number of nouns**

**2.6. Look through the text and write out all the plural nouns. Write the singular to each one.**

|  |  |  |
| --- | --- | --- |
| *For example:* | Plural | Singular |
|  | *fish* | *fish* |
|  | *people* | *person* |
|  | *countries* | *country* |
|  | … | … |

**2.7. \* Complete these paragraphs from a geography book. Put the words in brackets into the plural.**

This small country is mostly farmland. The (animal) seen most often are (cow) and (sheep). Most (farm) have a few (goose), too. There are (donkey), but not many (horse). There’s a lot of wheat and (potato), and there are (tomato) on the south side of the hills. In summer the (man), (woman) and (child) work together in the (field) seven (day) a week. The (person) work hard all their (life).

The only two (factory) in the country are in the capital. One makes (toy) and (game), and the other makes (knife) and (fork). All these (thing) are for export.

The east end of the country is thick forest, the home of wild (pony), (deer) and (wolf).

(Photo) of the (cliff) along the coast show how beautiful the country is. But not many (tourist) visit it because the airport is too small foe most (aircraft).

**2.8. Odd one out. Look at the list below and say which word is odd one out in each line. Why?**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| a) | ship | food | meal | diet |
| b) | assortment | variety | fun | selection |
| c) | carp | pest | salmon | trout |
| d) | ocean | lake | pond | game |
| e) | substance | chemical | asthma | compound |
| f) | attack | process | injure | kill |
| g) | pet | glue | medicine | feed |
| e) | fish | species | poison | animals |

**2.9. Put one of the words from exercise 2.8. into each gap.**

1. Many people keep fish as \_\_\_\_\_\_ .
2. A few species of fish became \_\_\_\_\_\_ after being introduced into certain waters.
3. Marlin and swordfish are giant \_\_\_\_\_\_ fish.
4. Some fish produce \_\_\_\_\_\_ used as medicine.
5. Industries \_\_\_\_\_\_ certain fish to make \_\_\_\_\_\_, livestock \_\_\_\_\_\_ and other products.
6. People eat fish to add \_\_\_\_\_\_ to their meals.
7. Fish farms in the USA raise \_\_\_\_\_\_ and \_\_\_\_\_\_.
8. Certain ­\_\_\_\_\_\_ of fish can attack, injure and even kill a human being.

**2.10. Key to exercise 2.7.**

Animals, cows, sheep, farms, geese, donkeys, horses, potatoes, tomatoes, men, women, children, fields, days, persons, lives, factories, toys, games, knives, forks, things, ponies, deer, wolves, photos, cliffs, tourists, aircraft.

**UNIT 3**

**KINDS OF FISH**

**3.1. Practise the pronunciation of the following words and expressions:**

**species** [´spi:∫i:z] – *биол.* вид, разновидность

**species of vertebrates** [´vз:tıbr(e)ıts]

**scientist** [´saiəntist] – учёный

**ichthyologist** [ˏikθi´ɔləʤist] – ихтиолог

**skeleton** [´skelitn] – скелет

**tough** [´tʌf] – упругий, плотный, прочный, крепкий

**cartilage** [´ka:tiliʤ] – хрящ

**chimaera** [k(a)i´miərə] – химера

**sturgeon** [´stз:ʤ(ə)n] – осётр

**3.2. Read the text and answer the questions after each paragraph.**

Scientists have named and described about 21,700 kinds of fish. Each year, they **discover** new species, and so **the total** increases continually. Fish make up more than half of all known species of vertebrates.

*1. How many kinds of fish have scientists named and described?*

Scientists who study fish are called ichthyologists. They divide fish into two main groups: (1) **jawed** and (2**) jawless**. Almost all fish have **jaws**. The only jawless species are **lampreys** and **hagfish**. Jawed fish are further divided into two groups according to the composition of their skeletons. One group has a skeleton **composed of** a tough, elastic substance called cartilage.

Sharks, rays, and chimaeras make up this group. The other group has a skeleton composed largely or partly of bone. Members of this group, called **bony fish**, make up **by far** the largest group of fish in the world.

*2. What two main groups do ichthyologists divide fish into?*

*3. How are jawed fish further divided?*

*4. Why are sharks, rays and chimaeras included into one group?*

*5. What fish make up the largest group in the world?*

**BONY FISH**

Bony fish can bedivided into two main groups according to the composition of their skeletons. One group **consists of** modern bony fish, whose skeletons are composed largely of bone. The second group consists of primitive bony fish, whose skeletons are partly bone and partly cartilage.

*6. What two groups can bony fish be divided into?*

Modern bony fish include about 20,860 species. They make up about 95 per cent of all known kinds of fish. Some have bony skeletons. They are called **teleosts**, which comes from two Greek words meaning *complete* and *bone*. Nearly all food fish, game fish, and aquarium fish are teleosts. They include such well-known groups of fish as bass, catfish, cod, herring, minnows, perch, trout, and tuna. Each group of fish consists of a number of species. For example, **Johnny darters**, **walleyes**, and yellow perch are all kinds of perch.

*7. Why are most of modern fish called teleosts?*

*8. How many species of modern bony fish are known?*

Many millions of years ago, there were only a few species of teleosts. They were greatly **outnumbered** by sharks and the **ancestors** of certain **present-day** bony fish. The early teleosts **looked much alike** and lived in only a few parts of the world. Yet they became the most numerous, varied, and widespread of all fish mainly because they were better able than other fish to **adapt** (**adjust**) **to** changes in their environment. In adapting to these changes, their bodies and body organs changed **in various ways**. Such changes are called adaptations.

 *9. Why did early teleosts become the most numerous of all fish?*

*10. How did their bodies and organs change?*

Today, the various species of teleosts differ from one another in so many ways that **they seem** **to have little in common**. For example, many teleosts have **flexible**, highly efficient fins, which have helped them become excellent swimmers. **Sailfish** and tuna can swim long distances at high speed. Many teleosts that live among coral reefs are expert at **darting** in and out of the coral. But a number of other teleosts swim hardly at all. Some **anglerfish** spend most of their adult life lying on the ocean floor. Certain eellike teleosts are **finless** and so are poor swimmers. They **burrow into mud** on the bottom and remain there much of the time. Many teleosts have fins that are adapted to uses other than swimming. For example, flying fish have winglike fins that help them **glide above** the surface of the water. The **mudskipper** has muscular fins that it uses **to hop** about on land.

*11. How do the present-day teleosts differ from the early teleosts?*

*12. Why are some teleosts excellent swimmers?*

*13. What species of bony fish are poor swimmers? Why?*

*14. How do the flying fish and the mudskipper use their fins?*

Other modern bony fish include sturgeons, **paddlefish**, **gars**, and **bowfins**. Sturgeons **rank as** the largest of all freshwater fish. The largest sturgeon ever caught weighed more than 2,800 pounds (1,300 kilograms). Instead of **scales**, sturgeons have an **armorlike** **covering** consisting of five rows of thick, **bony** **plates**. Some sturgeons live in salt water but return to fresh water to lay their eggs. Paddlefish are strange-looking fish found only in China and the Mississippi Valley of the United States. They have huge **snouts** shaped somewhat like **canoe paddles**. Bowfins and gars are extremely **fierce** fish of eastern North America. They have unusually strong jaws and sharp teeth.

*15. What freshwater fish is the largest?*

*16. What are sturgeons covered with?*

*17. Where can paddlefish be found?*

*18. What makes paddlefish strange-looking?*

*19. Why are bowfins and gars called ‘extremely fierce fish’?*

**VOCABULARY**

**to discover** – открыть

**the total** – общее количество

**jaw** [´ʤɔ:] – челюсть

**jawed fish** – челюстные, челюстноротые

**jawless fish** – бесчелюстные

**lamprey** [´læmpri]– минога

**hagfish** – миксина

**to be composed of smth** – состоять из чего-л.

**bony fish** – костные рыбы

**by far** – безусловно; намного, гораздо

**to consist of smth** – состоять из чего-л.

**teleosts** – костистые рыбы

**Johnny darters** – мелкая пресноводная рыба

**walleye** – светлоперый (североамериканский) судак

**to outnumber** – превосходить численно

**ancestor** [´ænsəstə]– предок, прародитель

**present-day –** современный

**look alike** – выглядеть одинаково, быть похожими по внешнему виду

**to adapt to smth –** приспособиться к чему-л., адаптироваться

**to adjust to smth** – приспособиться к чему-л.

**in various ways** – различными способами

**to have little in common** – иметь мало общего

**They seem have little in common. –** Кажется, они имеют мало общего.

**flexible** – гибкий, эластичный, упругий

**sailfish – (***зоол.*) парусник

**to dart** – ринуться (вниз), пикировать, помчаться стрелой, устремиться

**anglerfish** – европейский удильщик, или морской чёрт

**finless** – без плавников

**to burrow into mud** – зарываться в грязь

**to glide above smth** – скользить, парить над чем-л.

**mudskipper –** (*зоол.*) прыгун

**to hop (about)** – прыгать, скакать, подпрыгивать

**paddlefish** – (*зоол.*) вислонос

**gar** – сарган, морская щука

**bowfin** – амия, ильная рыба

**to rank as** – занимать какое-л. место, считаться каким-л.

**scales** – чешуя

**armour** – (*зоол.*) панцирь

**armourlike covering –** панциреобразное покрытие

**bony plates** – костные пластины

**snout** – рыло, морда, нос

**paddle** – байдарочное весло, лопасть; (*зоол.*) плавник, ласт

**fierce** – свирепый, лютый

**3.3. Match these statements as true (T) or false (F). Correct the false statements and paraphrase the correct ones using information from the text.**

1. All kinds of fish have already been named and discovered.
2. Sharks and rays belong to jawless fish.
3. Cartilage is a tough, elastic substance of which skeleton of some fish is composed.
4. Cartilage fish is the largest group of fish in the world.
5. Skeletons of nearly all aquarium fish are composed of bone.
6. Primitive bony fish were numerous and widespread.
7. The present-day teleosts look very much alike.
8. All teleosts are excellent swimmers.
9. Sturgeons cannot live in salt water.
10. Sturgeons always lay their eggs in fresh water.

**3.4. Give the Russian equivalents of the following expressions.**

1) To make up more than half of all known species; 2) to divide into two groups according to the composition of the skeleton; 3) a skeleton composed of cartilage; 4) a skeleton composed of bone; 5) to consist of smth; 6) to include smth; 7) to differ from one another in many ways; 8) to change in various ways; 9) to have little in common; 11) to look alike; 12) to rank as the largest of freshwater fish.

**3.5. Translate the words in brackets using one of the expressions from the above exercise.**

1. Modern bony fish (составляют) about 95 per cent of all known kinds of fish.

2. Scientists (делят) bony fish (на две основные группы) according to the composition of their skeleton.

3. Modern teleosts (включают) nearly all food fish, game fish and aquarium fish.

4. Sharks, rays and chimaeras have (хрящевой скелет).

5. Each group of modern bony fish (состоит из) a number of species.

6. Sturgeons (считаются) as the largest of all freshwater fish.

7. The early teleosts (выглядели одинаково), but today various species of teleosts (отличаются друг от друга) very much.

**3.6. Match the English words and their meanings.**

|  |  |
| --- | --- |
| 1. largely
2. partly
3. nearly
4. continually
5. greatly
6. mainly
7. hardly
8. extremely
9. unusually
 | 1. очень, значительно, весьма
2. чрезвычайно, крайне
3. необычно
4. почти
5. постоянно
6. главным образом
7. едва ли
8. в значительной степени
9. частью, частично, отчасти
 |

**3.7. Read the sentences in a loud voice and translate them into Russian.**

1. Skeletons of modern bony fish are composed largely of bone.
2. Nearly all food fish and game fish are teleosts.
3. Millions of years ago teleosts were greatly outnumbered by sharks and other species of fish.
4. Teleosts became the most numerous of all fish mainly because they better adapted to changes in their environment.
5. Many teleosts are excellent swimmers, but a number of other teleosts swim hardly at all.
6. Bowfins and gars are extremely fierce fish because they have unusually strong jaws and sharp teeth.
7. Skeletons of primitive bony fish are partly bone and partly cartilage.

**UNIT 4**

**WHERE FISH LIVE**

**4.1. Before reading the text translate the following words and word combinations into Russian. Practise their pronunciation.**

|  |  |  |
| --- | --- | --- |
| to thriveoceanmarshswamppoolbrookspringcreek | high above sea levelmountain streamfreshwater environmentssaltwater environmentsshallow tropical watersstreammoist mudcaves | far below sea leveltemperate waterswarm watersfresh waterscoral reefssalty watersicy waterswater holes |

**4.2. Read the texts and answer the questions.**

Fish live almost anywhere there is water. They thrive in the warm waters of the South Pacific and in the icy waters of the Arctic and Antarctic oceans. Some live high above sea level in mountain streams. Others live far below sea level in the deepest parts of the ocean. Many fish have adapted themselves to living in such unusual places as caves, desert water holes, marshes, and swamps. A few fish, including the African and South American **lungfish (***двоякодышащие рыбы***)**, can even live for months in moist mud.

*1. What kinds of waters can fish live in?*

*2. Can fish live above or below sea level?*

*3. What unusual places can many fish live in?*

Fish thus live in many environments. But all these environments can be classified into two major groups according to the saltiness of the water: (1) saltwater environments and (2) freshwater environments. Some fish can live only in the salty waters of the ocean. Others can live only in fresh water. Still others can live in either salt water or fresh water.

*4. How many groups are environments where fish live divided into?*

*5. According to what characteristic are the environments divided into these groups?*

**SALTWATER ENVIRONMENTS**

About 13,300 species – or about three-fifths of all known fish – live in the ocean. These saltwater, or marine, fish live in an almost endless variety of ocean environments. Most of them are suited to a particular type of environment and cannot survive in one much different from that type. Water temperature is one of the chief factors in determining where a fish can live. Water temperatures at the surface range from freezing in polar regions to about 86 degrees F. (30 degrees C) in the tropics.

*6. Do many species of fish live in the ocean?*

*7. What ocean environments can saltwater fish live in?*

*8. What is one of the main factors determining where a fish can live?*

Many saltwater species live where the water is always warm. The warmest parts of the ocean are the shallow tropical waters around coral reefs. More than a third of all known saltwater species live around coral reefs in the Indian and Pacific oceans. Many other species live around reefs in the West Indies. Coral reefs **swarm with** **angelfish**, **butterfly fish**, **parrot fish**, and thousands of other species with fantastic shapes and brilliant colours. Barracudas, **groupers**, moray eels, and sharks **prowl** the clear coral waters **in search of** **prey**.

 *9. What parts of the ocean are the warmest?*

*10. How many saltwater species live around coral reefs?*

*11. What species do coral reefs swarm with?*

*12. What is typical of fish living around reefs?*

*13. Why can barracudas, sharks and other predatory fish often be found near coral reefs?*

Many kinds of fish also live in ocean waters that are neither very warm nor very cold. Such temperate waters **occur** north and south of the tropics. They make excellent **fishing grounds**. The richest fishing grounds lie off the northeast coast of North America and the northwest coast of Europe. These areas **yield** huge **catches** of cod, **flatfish**, herring, and other food fish.

*14. What ocean waters make excellent fishing grounds?*

*15. Where do the richest fishing grounds lie?*

*16. Why are these areas considered to be the richest fishing grounds?*

The cold waters of the Arctic and Antarctic oceans have fewer kinds of fish than do tropical and temperate waters. Arctic fish include **bullheads**, **eelpouts**, **sculpins**, **skates**, and a jellylike, scaleless fish called a sea **snail**. Fish of the Antarctic Ocean include the small, perchlike Antarctic cod, eelpouts, and the icefish, whose blood is nearly **transparent** rather than red.

Different kinds of fish also live at different depths in the ocean. The largest and fastest-swimming fish live near the surface of the open ocean and are often found great distances from shore. Fish that live near the surface of the open ocean include **bonito**, **mackerel**, marlin, swordfish, tuna, and a variety of sharks. Some of these fish make long annual migrations that range from tropical to near polar waters.

Many more kinds of ocean fish live in midwater and in the depths than near the surface. Their environment differs greatly from that of species which live near the surface. Sunlight cannot reach far beneath the ocean's surface. Below about 600 feet (180 meters), the waters range from **dimly lit** to completely dark. Most fish that live in midwater far out at sea **measure** less than 6 inches (15 centimetres) long and are black, black-violet, or reddish-brown. Most of them have **light organs** that **flash** on and off in the darkness. Many also have large eyes and mouths. A number of midwater species are related to the herring.

*17. What different levels of the ocean can marine fish live at?*

*18. What kinds of fish usually live near the surface of the ocean?*

*19. Why do most of the fish that live in midwater have light organs?*

*20. What other features are characteristic of midwater species?*

Some fish species live on the ocean bottom. Many of these fish, such as eels, **flounders**, puffers, seahorses, and **soles**, live in shallow coastal waters. But many others live at the bottom far from shore. They include **rattails** and many other fish with large heads and eyes and long, slender, pointed tails. Many species of rattails grow 1 foot (30 centimetres) or more long. One of the strangest **bottom dwellers** of the deep ocean is the tripod, or **spider**, fish. It has three long fins like the legs of a tripod or a three-legged stool. The fish uses its fins to sit on the ocean bottom.

*21. What fish species live on the ocean bottom?*

*22. Why is the spider fish one of the strangest bottom dwellers?*

Some kinds of fish live in **brackish** (slightly salty) water. Such water occurs where rivers **empty into** the ocean, where salt water collects in coastal swamps, and where pools are left by the outgoing **tide**. Brackish-water fish include certain species of barracudas, flatfish, **gobies**, herring, **killifish**, **silversides**, and **sticklebacks**. Some saltwater fish, including various kinds of herring, lampreys, salmon, **smelt**, and sticklebacks, can also live in fresh water.

*23. Where can brackish water be found?*

*24. What species do brackish-water fish include?*

**VOCABULARY**

**to swarm with smth** [´swɔ:m] – кишеть (кем, чем)

**angelfish** – рыба-ангел

**butterfly fish** – рыба-бабочка

**parrot fish** – рыба-попугай, или скаровая рыба

**grouper** – морской окунь

**to prowl** [´praul]–красться, бродить, рыскать

**prey** – добыча, жертва

**in search of prey** – в поисках добычи

**to occur** [ ə´kз:] **–** встречаться, попадаться

**to make** – *зд.* составлять, равняться, представлять собой

**fishing grounds** – рыбное место, тоня; рыболовный район

**to yield** [´ji:ld] – приносить, давать

**catch (*n*)** – улов

**bullhead** – подкаменщик, сомик

**eelpout** – (*зоол.*) бельдюга

**sculpin** – керчак, или рогатковая рыба

**skate** – ромбовый скат

**snail** – улитка

**transparent** – прозрачный

**bonito** – скумбрия, пеламида, сарда

**mackerel** [´mækrəl] – скумбрия, макрель

**dimly lit** – тускло освещённый

**to measure** – иметь размер

**light organs** – светящиеся органы

**to flash on / off** – вспыхивать

**flounder** – плоская рыба (камбала и т.п.)

**sole** – морской язык, камбала, палтус

**rattail** – макрурус (из отряда трескообразных)

**pointed** – остроконечный, заостренный

**bottom dwellers** – обитатели дна

**spider fish** – морской паук

**brackish water** – солоноватая вода

**to empty into**  – впадать в…

**killifish** – атеринообразная рыба

**silverside** – (*зоол.*) кижуч, атеринка

**stickleback** – колюшка

**smelt** – корюшка

**FRESHWATER ENVIRONMENTS**

 Fish live on every continent except Antarctica. They are found in most lakes, rivers, and streams and in brooks, creeks, marshes, ponds, springs, and swamps. Some live in streams that pass through caves or flow deep underground.

*25. Do fish live in Antarctica?*

*26. Where are fish found on the continents?*

Scientists have classified about 8,400 kinds of freshwater fish. They make up about two-fifths of all fish species. Almost all freshwater fish are bony fish. Many of these bony fish belong to a large group that includes carp, catfish, **characins**, electric eels, **loaches**, **minnows**, and **suckers**. In this group, catfish alone total more than 2,000 species.

*27. How many species do freshwater fish make up?*

*28. What kind of fish do almost all freshwater fish belong to?*

Like ocean fish, freshwater fish live in a variety of climates. Tropical regions of Africa, Asia, and South America have the most species, including hundreds of kinds of catfish. Africa also has many **cichlids** and **mormyrids**. A variety of colorful loaches and minnows live in Asia. South American species include electric eels, piranhas, and tetras. Temperate regions, especially in North America, also have many freshwater species, including bass, carp, minnows, perch, and trout. **Blackfish** and **pike** live in the Arctic.

*29. What regions have the most species of freshwater fish? Why?*

*30. Are temperate regions rich in freshwater species?*

In every climate, certain kinds of freshwater fish require a particular kind of environment. Some species, including many kinds of **graylings**, minnows, and trout, live mainly in cool, clear, fast-moving streams. Many species of carp and catfish thrive in warm, muddy, slow-moving rivers. Some fish, such as **bluegills**, lake trout, white bass, and **whitefish**, live chiefly in lakes. Black bullheads, largemouth bass, **muskellunge**, northern pike, rainbow trout, yellow perch, and many other species are found both in lakes and in streams and rivers.

*31. What kind of environment do graylings and trout require?*

*32. What kind of environment do carp and catfish require?*

*33. What species of fish live chiefly in lakes?*

Like marine fish, freshwater fish live at different levels in the water. For example, many cave, spring, and swamp fish live near the surface. Gars, muskellunge, and whitefish ordinarily live in midwater. Bottom dwellers include darters, sturgeon, and many kinds of catfish and suckers.

*34. Are different levels in the water important for freshwater fish?*

Some freshwater species live in unusual environments. For example, some live in mountain streams so **swift** and **violent** that few other forms of life can survive in them. These fish **cling** to rocks with their mouth or some special **suction organ**. A number of species live in caves and underground streams. These fish never see daylight. Most of them have pale or white skin, and many of them are blind. A few kinds of freshwater fish live in hot springs where the temperature rises as high as 104 degrees F. (40 degrees C).

*35. What unusual environments can freshwater fish live in?*

**VOCABULARY**

**characin** [´kærəsin] – харациновые рыбы

**loach** [´ləut∫] – голец

**minnow** – пескарь, гольян

**sucker** – чукучан, чукучановые рыбы

**cichlid** [´sik´lid] – цихлиды, цихловые рыбы

**mormyrid** – клюворылы, клюворылые рыбы

**blackfish** – даллия, или чёрная рыба

**pike** [´paik] – щука

**grayling** – хариус

**bluegill** – солнечный окунь

**whitefish** – сиг

**muskellunge** – щука-маскинонг

**swift** – быстрый

**violent** – бурный

**to cling to smth** – прилипать к чему-л., цепляться, хвататься, держаться

**4.3. Correct the false statements.**

1. Fish don't live in the icy waters of the Arctic and Antarctic oceans.
2. All the environments where fish live are classified into two major groups according to the sea level.
3. There are nо fish which саn live both in salty and fresh water.
4. Marine fish can survive in any saltwater environment.

**PART II**

**4.4. Practise the pronunciation of the following words. Memorize them.**

to **affect** [ə´fect] smth – воздействовать, влиять на что-л.

to have an **effect** [i´fect] on smth– оказывать воздействие, влияние на что-л.; воздействовать, влиять на что-л.

**likewise** [´laikwaiz] – также, подобно, таким же образом

**parasite** [´pærəsait] – паразит

**predator** [´predətə] – хищник

**4.5. Read the text below and answer the questions:**

* *What is called environment?*
* *What factors have a significant effect on the kinds of organisms that live in an area?*

# ENVIRONMENT

It is impossible to understand an organism apart from its environment. Everything that affectsorganism during its lifetime is collectively cold its environment. Physical factors, such as weather, soil type, altitude, living space and the amount of sunlight, have a significant effect on the kinds of organisms that can live in an area. Likewise, how the organism interacts with other organisms, such as the types of plants used for food and shelter, parasites, and predators, is part of the environment. Environmental factors that limit the growth of an organism or that restrict the size of a population or its geographical range are called **limiting factors**.

**4.6. Before reading the text ‘Limiting factors’ translate the following word combinations into Russian.**

1. tree-lined mountain stream;
2. the level of dissolved oxygen;
3. the amount of dissolved oxygen present in the water;
4. to oxygenate the water;
5. the canopy of trees over the stream;
6. oxygen concentration;
7. a greater range of tolerance to oxygen concentration;
8. swiftly flowing stream; slowly flowing stream;
9. a high amount of silt;
10. under these conditions.

**4.7. Read the text and find all the physical factors that are important for survival of many species of fish.**

**LIMITING FACTORS**

The limiting factor for many species of fish is the amount of dissolved oxygen present in the water. In a swiftly flowing, tree-lined mountain stream, the level of dissolved oxygen is high and provides a favorable environment for trout. As the stream continues down the mountain, the steepness of the slope decreases, which result in fewer rapids to oxygenate the water. In addition, the canopy of trees over the stream usually is thinner, allowing more sunlight to reach the stream and warm the water. Warm water cannot hold as much dissolved oxygen as cool water. Therefore, decreasing mixing and increasing temperature result in a decreased level of dissolved oxygen to a level below that required by trout. Fish such as black bass and walleye replace the trout, since they are able to tolerate lower oxygen concentrations and higher water temperatures. These species have a greater **range of tolerance** to oxygenconcentration and water temperature. Thus, low level of oxygen and high water temperature are limiting factors for the distribution of trout.

 In addition to temperature and oxygen concentration, other factors may influence the ability of water to support certain species of fish. If we continue to follow our stream, it will eventually become a broad, slowly flowing river. Much of the land along the river probably will be devoted to agriculture. This will result in significant amounts of silt and other soil particles entering the river. Most of the surface of the river will be exposed to the warming effects of the sun, resulting in additional temperature increases and a reduced oxygen concentration. Under these conditions, we may see the bass and walleye replaced by such species as carp and catfish, which have an even greater range of tolerance to high temperatures and low oxygen concentrations and are better able to survive in water with a high amount of silt.

Similarly, the amount of grass available for food is a limiting factor for grazing animals; low temperature is a limiting factor for most kinds of frogs, lizards, and snakes; the amount of available sunlight is a limiting factor for many kinds of plants.

**4.8. What other limiting factors are mentioned in the text? What organisms do they affect?**

**4.9. True or false? Correct the false statements.**

1. Rapids help to oxygenate the water in a swiftly flowing mountain stream.

2. Trout can’t live in cool water.

3. There is much more dissolved oxygen in warm water than in cool water.

4. Trout are replaced by black bass in the water with a decreased level of dissolved oxygen.

5. Black bass have a greater range of tolerance to oxygen concentration and water temperature than carp.

6. The more of the river surface is exposed to the sun, the warmer the water in the river is.

7. High amount of silt is a limiting factor for carp and catfish.

8. Water with a reduced oxygen concentration and high temperatures is a favorable environment for carp and catfish.

**4.10. Insert the suitable preposition: over to** (2) **in for**

1. Higher temperatures result ­­\_\_\_\_ a decreased level of dissolved oxygen.
2. Some species of fish have a greater range of tolerance \_\_\_\_\_ oxygen concentration and water temperature.
3. Much of the land along a slowly flowing river is devoted \_\_\_agriculture.
4. The amount of available sunlight is a limiting factor \_\_\_\_\_ many kinds of plants.
5. The thin canopy of trees \_\_\_\_\_ the stream allows more sunlight to reach the stream and warm the water.

**Grammar: Participles**

**4.11. Find in the text ‘Limiting Factors’ participles of the given verbs and complete the table. Write out all the word combinations with these participles and translate them into Russian. For example:**

***limiting factors –*** *ограничительные факторы*

***dissolved oxygen*** *– растворённый кислород*

***slowly flowing river*** *– медленно текущая река*

|  |  |  |
| --- | --- | --- |
| **Verb** | **Participle I** | **Participle II (Past Participle)** |
| to limit | *limiting* |  |
| to dissolve |  | *dissolved* |
| to flow | *flowing* |  |
| to allow |  |  |
| to decrease |  |  |
| to increase |  |  |
| to require |  |  |
| to devote |  |  |
| to enter |  |  |
| to expose |  |  |
| to result |  |  |
| to reduce |  |  |
| to replace |  |  |
| to graze |  |  |

**4.12. Choose the best phrase A – K given below the text to fill in each of the blanks. Some of the suggested answers do not fit at all.**

**FINDING FISH**

Fish are like any other living creature in that they react in a number of different ways to the weather. The heat of water in which they live (1) … are the two most important factors we have to consider when we try to find fish.

Fish can rise or sink into the water according to the temperature (2) … they can also seek life-giving oxygen by moving closer to places (3) …, such as waterfalls, fast-running streams and streams that run into a lake. Rainfall and wind sweeping across a lake also bring oxygen into the water, (4) …. Some fish do not need the same quantities of oxygen as others, so they are found in deep lakes (5) … The trees drop an enormous number of leaves onto the lake every winter. These decay, releasing dangerous gas. In winter, we find that the warmest water is at the bottom of lakes and ponds. Fish tend to feed right at the bottom. Some stop feeding altogether as the cold months arrive, falling into a state of partial **hibernation** (*зимняя спячка*), (6) … . In summertime, we find a complete reversal of water temperature. The warmest water is just under the surface of the lake. As the depth becomes greater, so the water gets a lot colder. Fish that use little oxygen can rise to feed near the top of the water, (7) … .

Rivers are much less affected by hot weather. They are fed by water that seeps through the ground, (8) … and therefore not absorbing heat as still water does.

(from *Certificate in Advanced English Handbook*,

University of Cambridge Local Syndicate, 1995)

1. often surrounded by trees

B. constantly on the move

C. and the amount of oxygen available to them

D. and generally they are swept across the lake to the windy side

E. that they find most comfortable

F. to be replaced by warmer water

G. coming out only on occasional sunny days

H. that cause oxygen to be taken into the water

I. for warm water contains less oxygen than colder water

J. to the deeper parts of the lake

K. making the living conditions better for inhabitants

**UNIT 5**

**FISH MIGRATIONS**

**5.1. Before reading the text practise the pronunciation of the following words and expressions. Learn them.**

**to migrate** [mai´greit] – мигрировать

**to spawn** [´spɔ:n] – метать икру, размножаться

**spawning** [´spɔ:niŋ ] – нерест

**anadromous fish**  [ə´nædrəməs] – анадромная, проходная рыба

**catadromous fish** [kə´tædrəməs] – катадромная, полупроходная рыба

**alewives** *pl. of* **alewife** [´eilwaif] – поломбы, или пузанковые сельди

**shad** [´∫æd] – шэд (западноевропейская сельдь)

**to hatch** [´hæt∫] – рождаться, вылупляться (из яйца), выводиться (о личинках)

**landlocked fish**  – пресноводная рыба

**goby** [´gəubi] – бычок

**haddock** [´hædək] – пикша

**5.2. Read the text and answer the questions after each paragraph.**

Relatively few kinds of fish can travel freely between fresh water and salt water. They make such migrations **to spawn** (lay eggs). Saltwater fish that swim to fresh water for **spawning** are called **anadromous fish**. They include **alewives**, blueback herring, sea lampreys, smelt, and most species of salmon and **shad**. Freshwater fish that spawn in salt water are called **catadromous** **fish**. They include North American and European eels and certain kinds of gobies. Some normally anadromous fish, including large numbers of certain species of alewives, lampreys, salmon, and smelt, have become **landlocked** –that is, they have become freshwater natives. After **hatching**, the young do not migrate to the ocean.

*1. Why do some fish migrate?*

*2. What fish are called anadromous?*

*3. What species do anadromous fish include?*

*4. What fish are called catadromous?*

*5. Do landlocked fish migrate to the ocean?*

Many saltwater species migrate from one part of the ocean to another at certain times of the year. For example, many kinds of mackerel and certain other fish of the open ocean move toward shore **to spawn**. Each summer, many species of **haddock** and other cold-water fish migrate from coastal waters to cooler waters farther out at sea. Some freshwater fish make similar migrations. For example, some trout swim from lakes into rivers to spawn. Some other fish of temperate lakes and streams, such as bass, bluegills, and perch, live near the warm surface during summer. When winter comes, the waters freeze at the surface but remain slightly warmer beneath the ice. The fish then migrate toward the bottom and remain there until warm weather returns.

*6. Where do many kinds of mackerel migrate to spawn?*

*7. Where do cold-water fish migrate each summer?*

*8. Where do some trout spawn?*

*9. Where do some fish of temperate lakes migrate when winter comes? Why?*

**5.3. Read the text below and answer the question: *How do animals navigate?***

One of the greatest mysteries of nature is the instinct to migrate. Every year millions of **creatures** feel the need to move for one reason or another. Most of us have seen the arrival or departure of migrating **flocks of birds**. Migration, however, **is not confined to** birds, but can be seen in **reptiles** (for example, **turtles**, **frogs**), insects (**butterflies**, **locusts**), fish (eels, salmon, **tunny**) and mammals (**reindeer**, **seals**, lemmings, whales, **bats**). Many of these creatures succeed in navigating over long distances. How exactly they manage to do this still remains a mystery. There are several possibilities. They may navigate by using one or more of the following:

1. The sun.
2. The stars.
3. The Earth’s magnetic field. (When a small bar magnet **is attached to** a **pigeon**, it is unable to navigate.)
4. A sense of smell.
5. Geographical features. (Birds flying from North Africa to France seem to follow coastlines and **valleys**.)
6. Changes in temperature. (Salmon can detect a change in water temperature as small as 0.03°C.)
7. Sound. (Whales and bats seem to use sonar.)

Experiments suggest that these navigational abilities are partly instinctive. In one famous experiment a young seabird from the island of Stokholm, off the Welsh coast, was taken across the Atlantic by plane to Boston, 5100 km away. It was **released**, and was back in its **nest** twelve and a half days later.

**VOCABULARY**

**creature** [´kri:t∫ə] – животное, живое существо

**flock of birds** – стая птиц

**to confine**, **to be confined to smth** – ограничиваться (чем-л.)

**reptile** [´reptail] – пресмыкающееся, рептилия

**turtle** [´tз:tl] – черепаха

**frog**  – лягушка

**butterfly**  – бабочка

**locust** [´ləukəst] – саранча

**tunny** [´tʌni] – тунец

**reindeer**  – северный олень

**seal –**  тюлень, морской котик

**bat –** летучая мышь

**to attach to smth** – прикрепить к чему-л.

**pigeon** [´piʤin] – голубь

**valley** [´væli] – долина

**to release**  [ri´li:s] – освобождать, выпускать

**nest –** гнездо

**5.4. Retell the text about migrations of animals. Make use of the active vocabulary.**

**Grammar: Collective nouns**

**5.5. Remember the words associated with certain animals:**

|  |  |
| --- | --- |
| 1. a **flock** of sheep or birds, *e.g.* geese/ pigeons
2. a **herd** of cows, deer, goats
3. a **shoal** of fish (or any particular fish, *e.g.* a **shoal** of herring/ mackerel)
4. a **school** of fish, whales
5. a **swarm** of insects (or any particular insect, most typically flying ones, *e.g.* a **swarm** of bees/ gnats [næts])
6. a **pack** of dogs or hyenas, wolves
 | **– отара** овец или **стая** птиц (гусей, голубей)**– стадо** коров, оленей, коз**– стая**, **косяк** рыбы (сельди и т. д.)**– косяк** рыбы, **стая** китов**– рой** насекомых (пчел, комаров)**– свора**, **стая** собак, гиен, волков |

**5.6. Fill each gap with a suitable collective noun.**

1. There are \_\_\_\_\_\_\_\_\_of mosquitoes in the forests in Scandinavia in the summer.
2. As we looked over the side of the boat, we saw a \_\_\_\_\_\_\_\_\_ of brightly coloured fish swimming just below the surface.
3. In spring you can see ­­­\_\_\_\_\_\_\_\_\_\_ of wild geese on that lake.
4. It is dangerous to meet a \_\_\_\_\_\_\_\_\_ of wolves in the forest.
5. This pedigree farm is famous for its \_\_\_\_\_\_\_\_\_ of milk cows.
6. Scientists watched a \_\_\_\_\_\_\_\_ of whales.

**5.7. Read the text and answer the questions.**

**THE EUROPEAN FRESHWATER EEL**

European Freshwater Eels, which look like snakes but are really fish, begin and end their lives in the Sargasso Sea, southeast of Bermuda. As eggs and larvae they drift for three years towards Europe, changing both shape and colour as they reach the fresh-water estuaries of European rivers. They spend the next nine to nineteen years in rivers, streams, lakes and ponds. As they approach old age they seem to have an unexplained compulsion to return to the Sargasso Sea to breed. Many eels, which have found their way into ponds and lakes, come out of the water and travel overland, gliding through damp grass. When they reach the sea, they make their way to the Sargasso, where they breed and die. No eels make the journey twice. The eel has an acute sense of smell, which is used for navigation in local waters, but inherited memory seems the only explanation for their migration to the Sargasso.

1. *Eel isn’t a reptile, is it?*
2. *It’s a fish, isn’t it?*
3. *Why do some people think it’s a reptile?*
4. *Where do the eels begin their lives? Where’s that?*
5. *How do they reach Europe? What happens on the way?*
6. *Where do they spend most of their lives?*
7. *How long do they live?*
8. *When and why do they return to the Sargasso Sea?*
9. *How do they travel overland?*
10. *How does the eel navigate in local waters?*
11. *It navigates by using a sense of smell, isn’t it?*
12. *How do they find their way to the Sargasso?*

**5.8. Retell the text. Use the questions after the text as a plan.**

**5.9. Key to Ex. 4.12.: 1C, 2 E, 3 H, 4 K, 5 A, 6 G, 7 I, 8 B.**

**UNIT 6**

**THE BODIES OF FISH**

**6.1. Remember the words before reading the text.**

**internal** – внутренний

**outer** – внешний

**intestines** – кишки, кишечник

**brain** – мозг

In some ways, a fish's body resembles that of other vertebrates. For example, fish, like other vertebrates, have an internal skeleton, an outer skin, and such internal organs as a heart, intestines, and a brain. But in a number of ways, a fish's body differs from that of other vertebrates. For example, fish have fins instead of legs, and gills instead of lungs. This section deals with the physical features that most fish have in common.

**6.2. Fill in the gaps with the appropriate words.**

1. Brain, heart, intestines, lungs are \_\_\_\_\_\_ organs.
2. Fish have an internal skeleton like other \_\_\_\_\_\_ .
3. Fish have \_\_\_\_\_ instead of legs.
4. Fish breathe with the help of \_\_\_\_\_\_ .

**EXTERNAL ANATOMY**

**6.3. Practise the pronunciation of the following words before reading the next paragraph.**

**shape** – форма

**streamlined** – обтекаемый

**neck** – шея

**to blend into smth** – соединяться, сочетаться с чем-л., переходить в…

**trunk** – туловище

**tail** – хвост

**to flatten** – становиться плоским, сплющиваться

**to resemble smth** – иметь сходство с чем-л., походить на что-л.

**pipefish** – морская игла

**slender** – тонкий, стройный

**weed** – водоросль

**camouflage** [´kæmufla:ʒ] – маскировка, камуфляж

**protective resemblence** – защитное сходство

**prey** – добыча, жертва

**6.4. Read the text and answer the questions after it.**

**SHAPE**

Most fish have a **streamlined** body. The head is somewhat rounded at the front. Fish have no **neck**, and so the head **blends** smoothly into the **trunk**. The trunk, in turn, narrows into the **tail**. Aside from this basic similarity, fish have a variety of shapes. Tuna and many other fast swimmers have a torpedolike shape. Herring, freshwater sunfish, and some other species are **flattened** from side to side. Many bottom-dwelling fish, including most rays, are flattened from top to bottom. A number of species are shaped like things in their surroundings. For example, anglerfish and stonefish **resemble** rocks, and **pipefish** look like long, **slender** **weeds**. This **camouflage**, called **protective** **resemblance**, helps a fish escape the notice of its enemies and its **prey**.

*1. What basic similarity do most fish have?*

*2. What other shapes can fish have?*

*3. Why are a number of species shaped like things in their surroundings?*

*4. What do anglerfish and stonefish resemble?*

*5. What do pipefish look like?*

*6. What is called protective resemblance?*

**6.5. Give the English equivalents of the following expressions.**

1) Oбтекаемое тело; 2) в свою очередь; 3) сужаться; 4) помимо этого основного сходства; 5) разнообразие форм; 6) торпедообразная форма; 7) сжатый с боков; 8) сплюснутый сверху вниз; 9) рыба, обитающая на дне (донная рыба); 10) ряд видов; 11) напоминать что-л.; 12) длинные тонкие водоросли; 13) защитное сходство; 14) остаться незамеченным (кем-то).

**6.6. Describe the body which most fish have. Make use of the prompts below.**

* to have a streamlined body
* head / to be rounded
* neck / to blend into…
* trunk / to narrow into…
* tail

**6.7. Learn the words and expressions below before reading the following passage.**

**tough** [tʌf] – жёсткий, плотный, упругий, крепкий

**blood vessel** [´blʌd ´vesl] – кровеносный сосуд

**connective tissue** – соединительная ткань

**slimy** [´slaimi] – илистый, скользкий

**mucus** [´mјukəs]– слизь

**cell** – (*биол.*) клетка

**chromatophore** [krəumətə´fɔ:] – хроматофор

**scale** – чешуя

**protective coloration** – покровительственная окраска, расцветка

**poisonous spine** – ядовитый шип

**surroundings**  – окрестности, окружающая среда

**to blend with the surroundings** – сливаться с окружающей средой

**pattern** – рисунок, узор

**colour patterns** – цветовые узоры

**6.8. Read the text and answer the questions after each paragraph.**

**SKIN AND COLOUR**

Most fish have a fairly **tough** skin. It contains **blood vessels**, nerves, and **connective tissue**. It also contains certain special **cells**. Some of these cells produce **slimy mucus**. This mucus makes fish slippery. Other special cells, called **chromatophores** or pigment cells, give fish many of their colours. A chromatophore contains red, yellow, or brownish-black pigments. These colours may combine and produce other colours, such as orange and green. Some species have more chromatophores of a particular colour than other species have or have their chromatophores grouped differently. Such differences cause many variations in colouring among species. Besides chromatophores, many fish also have whitish or silvery pigments in their skin and scales. In sunlight, these pigments produce a variety of bright rainbow colours.

*1. What does fish skin contain?*

*2. What makes fish slippery?*

*3. What cells make fish coloured?*

*4. What causes variations in colouring among species?*

*5. What pigments produce a variety of bright rainbow colours?*

The colour of most fish matches that of their surroundings. For example, most fish that live near the surface of the open ocean have a blue back, which matches the colour of the ocean surface. This type of camouflage is called **protective coloration**. But certain brightly coloured fish, including some that have **poisonous spines**, do not **blend with their surroundings**. Bright colours may protect a fish by confusing its enemies or by warning them that it has poisonous spines.

*6. What does ‘protective coloration’ mean?*

*7. What fish have a blue back? Why?*

*8. How can bright colours protect a fish?*

 Most fish can change their colour to match colour changes that are present in their surroundings. Flatfish and some other fish that have two or more colours can also change the **pattern** formed by their colours. A fish receives the impulse to make such changes through its eyes. Signals from a fish's nerves then rearrange the pigments in the chromatophores to make them darker or lighter. The darkening or lightening of the chromatophores produces the different **colour patterns**.

*9. Why do most fish change their colour?*

 *10. How do they change their colour?*

**6.9. Correct the following statements.**

1. Chromatophores are special cells, which make fish slippery.
2. Pigment cells produce slimy mucus.
3. Chromatophores contain blood vessels and connective tissue.
4. Fish that live near the surface of the ocean are always brightly coloured.
5. Brightly coloured fish always blend with their surroundings.
6. Most fish never change their colouring.

**6.10. Match the words in column A with the words in column B. Translate them into Russian.**

|  |  |
| --- | --- |
| **A** | **B** |
| 1. connective
 | 1. cells
 |
| 1. bright
 | 1. vessels
 |
| 1. poisonous
 | 1. tissue
 |
| 1. blood
 | 1. colours
 |
| 1. pigment
 | 1. ocean
 |
| 1. slimy
 | 1. surface
 |
| 1. protective
 | 1. spine
 |
| 1. ocean
 | 1. pigment
 |
| 1. whitish
 | 1. mucus
 |
| 1. open
 | 1. coloration
 |

**6.11. Insert the verbs from the box in the right sentences. Use the appropriate form of the verb.**

to confuse to match to contain to produce to cause to blend to rearrange

1. Chromatophores \_\_\_\_\_\_ red, yellow and brownish-black pigments.
2. Differently grouped chromatophores \_\_\_\_\_\_ many variations in colouring among species.
3. Bright colours of the fish often \_\_\_\_\_\_ their enemies.
4. Signals from a fish’s nerves can \_\_\_\_ the pigments in chromatophores.
5. Most fish change their colour \_\_\_\_\_\_ their surroundings.
6. Certain fish that have poisonous spines do not \_\_\_\_\_\_ with their surroundings.
7. In sunlight, whitish and silvery pigments \_\_\_\_\_\_ a variety of bright rainbow colours.

**6.12. Before reading the next passage practise the pronunciation of the word combinations below and learn them.**

**bony scales** – костные пластины, чешуйки

**jawed fish** – челюстная (челюстноротая) рыба

**protective covering** – защитное покрытие

**teleost fish** – костистая рыба

**scales rounded at the edge** [eʤ] – чешуя, закруглённая по краю

**ctenoid scales** [ti´nɔid] – ктеноидная чешуя

**cycloid scales** [´saiklɔid] – циклоидная чешуя

**ganoid scales** [´gænɔid] – ганоидная чешуя

**placoid scales** [´plækɔid] – плакоидная чешуя

**6.13. Read the text and answer the questions.**

**SCALES**

Most jawed fish have a protective covering of scales. Teleost fish have thin, bony scales that are rounded at the edge. There are two main types of teleost scales – ctenoid and cycloid. Ctenoid scales have tiny points on their surface. Fish that feel rough to the touch, such as bass and perch, have ctenoid scales. Cycloid scales have a smooth surface. They are found on such fish as carp and salmon. Some primitive bony fish, including gars, have thick, heavy ganoid scales. Sharks and most rays are covered with placoid scales, which resemble tiny, closely spaced teeth. Some fish, including certain kinds of eels and fresh-water catfish, are scaleless.

*1. What covering do most fish have?*

*2. What fish have no scales?*

*3. What scales do teleost fish have?*

*4. What is the difference between ctenoid and cycloid scales?*

*5. Why do bass and perch feel rough to the touch?*

*6. How do carp and salmon feel to the touch? Why?*

*7. What fish have ganoid scales?*

*8. What scales are sharks and most rays covered with?*

*9. What do placoid scales look like?*

**6.14. Read the text and answer the questions after each paragraph.**

**FINS**

Fins are **movable** structures that help a fish swim and keep its balance. A fish moves its fins **by means of muscles**. Except for a few finless species, all modern bony fish have **rayed fins**. Some primitive bony fish also have rayed fins. These fins consist of a web of skin supported by a skeleton of rods called **rays**. Some ray-finned fish have **soft rays**. Others have both soft rays and **spiny rays**, which are **stiff** and sharp to the touch. Some primitive bony fish have **lobed fins**, which consist of a fleshy base **fringed with** rays. Lobed fins are less **flexible** than rayed fins. Sharks, rays, and chimaeras have fleshy, skin-covered fins supported by numerous fine rays made of a tough material called **keratin**.

*1. What are fins?*

*2. Are there fish that have no fins?*

*3. What fins do all modern bony fish have?*

*4. What do rayed fins consist of?*

*5. What kinds of rays are there?*

*6. What do lobed fins consist of?*

*7. What fins do sharks and rays have?*

Fish fins are classified according to their position on the body as well as according to their structure. Classified in this way, a fin is either **median** or **paired**.

*8. How are fish fins classified?*

Median fins are vertical fins on a fish's back, underside, or tail. They include **dorsal**, **anal**, and **caudal** **fins**. The dorsal fin grows along the back and helps a fish keep upright. Almost all fish have at least one dorsal fin, and many have two or three. The anal fin grows on the underside near the tail. Like a dorsal fin, it helps a fish remain upright. Some fish have two anal fins. The caudal fin is at the end of the tail. A fish **swings** its caudal fin from side to side **to propel** itself through the water and to help in **steering**.

*9. What fins do median fins include?*

*10. What function do dorsal and anal fins perform?*

*11. What is the function of the caudal fin?*

Paired fins are two **identical fins**, one on each side of the body. Most fish have both **pectoral** and **pelvic** paired fins. The pectoral, or shoulder, fins of most fish grow on the sides, just back of the head. Most fish have their pelvic, or leg, fins just below and behind their pectoral fins. But some have their pelvic fins as far forward as the throat or nearly as far back as the anal fin. Pelvic fins are also called **ventral** fins. Most fish use their paired fins mainly to turn, stop, and make other manoeuvres.

*12. What kinds of paired fins do most fish have?*

*13. Where do the pectoral fins grow?*

*14. Where do the pelvic fins grow?*

*15. What is the function of the paired fins?*

**VOCABULARY**

**movable** – подвижный

**by means of smth** – посредством чего-л.

**muscle** [mʌsl]– мышца

**ray** – (скелетный) луч

**rayed fins** – (много)лучевые плавники

**soft rays** – мягкие лучи

**spiny rays** – колючие лучи

**stiff** – окостеневший, негибкий, неэластичный

**lobed fins** – разделённые на доли плавники

**fleshy** – мясистый

**fringed with smth** – окаймлённый, обрамлённый чем-л.

**flexible** – гибкий, гнущийся, податливый

**keratin** [´kerətin] – кератин, роговое вещество

**median fins** [´mi:diən] – непарные плавники

**paired fins** [´peəd] – парные плавники

**dorsal fin** [´dɔ:rs(ə)l] – спинной, дорсальный плавник

**anal fin** [´ein(ə)l] – заднепроходный, анальный плавник

**caudal fin** [kɔ:dl] – хвостовой плавник

**to swing** – качать, раскачивать, покачивать

**to propel** [prə´pel] – двигать вперёд, приводить в движение

**to steer** – управлять, держать курс

**identical fins** [ai´dentikl] – идентичные, абсолютно одинаковые плавники

**pectoral fins** [´pektər(ə)l] – грудные плавники

**pelvic fins** [´pelvik] – брюшные, абдоминальные плавники

**ventral fins** – брюшные, вентральные плавники

**6.15. Translate the words in brackets into English.**

1. A large flat sea fish with a long pointed tail is called (скат).
2. (Луч) is any of the bony spines supporting the fin membrane of a fish.
3. (Спинной плавник) grows along the back and helps a fish to keep upright.
4. (Хвостовой плавник) is at the end of the tail.
5. The anal fin grows on the underside (около хвоста).
6. The fins are divided into (парные и непарные) according to their position on the body as well as according to their structure.
7. Most fish have both (грудные) and (брюшные) paired fins.

**UNIT 7**

**SKELETON AND MUSCLES**

**7.1. Before reading the text learn the words given below.**

**backbone** [´bækbəun] **–** спинной хребет, позвоночник

**framework** – остов, корпус, каркас

**vertebra** [´vз:tibrə] (*pl.* **vertebrae** [´vз:tibrei]) – позвонок (позвонки)

**spine** – (*анат.*) спинной хребет, позвоночный столб; (*зоол.*) игла, шип

**rib** – ребро

**to be attached to smth** – сочленяться с…, присоединяться к чему-л.

**skull** [skʌl] – череп

**brain case** – черепная коробка, мозговой череп

**support** (*n*) **–** опорное образование, опорная структура

**pectoral girdle** [gз:dl]– кости грудного плавника

**pelvic girdle** – кости брюшного плавника, пояс брюшных плавников

**abdomen** [´æbdəmən] – брюшная полость, живот

**7.2. Read the text and answer the questions.**

A fish's skeleton provides a **framework** for the head, trunk, tail, and fins. The central framework for the trunk and tail is **the backbone**. It consists of many separate segments of bone or cartilage called **vertebrae**. In bony fish, each **vertebra** has a **spine** at the top, and each tail vertebra also has a spine at the bottom. Ribs are attached to the vertebrae. The **skull** consists chiefly of the **brain case** and **supports** for the mouth and gills. The pectoral fins of most fish **are attached to** the back of the skull by a structure called a **pectoral** **girdle**. The pelvic fins are supported by a structure called a **pelvic girdle**, which is attached to the pectoral girdle or supported by muscular tissue in the **abdomen**. The dorsal fins are supported by structures of bone or cartilage, which are rooted in tissue above the backbone. The caudal fin is supported by the tail, and the anal fin by structures of bone or cartilage below the backbone.

 *1. What is the backbone?*

 *2. What does the backbone consist of?*

 *3. What is there at the top of each vertebra in bony fish?*

 *4. Where does each tail vertebra have a tail?*

 *5. What is attached to the vertebrae?*

 *6. What does the skull consist of?*

 *7. Where are the pectoral fins attached?*

 *8. What are the pelvic fins supported by?*

 *9. What are the dorsal fins supported by?*

*10. What is supported by the tail?*

Like all vertebrates, fish have three kinds of muscles: (1) skeletal muscles, (2) smooth muscles, and (3) heart muscles. Fish use their skeletal muscles to move their bones and fins. A fish's flesh consists almost entirely of skeletal muscles. They are arranged one behind the other in broad vertical bands called **myomeres (**миомеры, мышечные сегменты). The myomeres can easily be seen in a skinned fish. Each myomere is controlled by a separate nerve. As a result, a fish can bend the front part of its body in one direction while bending its tail in the opposite direction. Most fish make such movements with their bodies to swim. A fish's smooth muscles and heart muscles work automatically. The smooth muscles are responsible for operating such internal organs as the stomach and intestines. Heart muscles form and operate the heart.

*11. What kinds of muscles do fish have?*

*12. What does a fish’s flesh consist of?*

*13. What is the function of skeletal muscles?*

*14. What do we call myomeres?*

*15. What movements do most fish make with their bodies to swim?*

*16. Why can most fish make such movements?*

*17. How do a fish’s smooth muscles and heart muscles work?*

*18. What is the function of the smooth muscles?*

*19. What is the function of heart muscles?*

**7.3. Give the English equivalents of the following expressions.**

1) Cкелетные мышцы, 2) гладкие мышцы, 3) сердечные мышцы, 4) широкие вертикальные полосы, 5) рыба, у которой снята кожа, 6) внутренние органы, 7) желудок, 8) кишки (кишечник).

**UNIT 8**

**SYSTEMS OF THE BODY**

**8.1. Before reading the text learn the words given below.**

**respiratory system** [re´spirətəri] – респираторная, дыхательная система

**digestive** **system** [d(a)i´ʤestiv] – пищеварительная система

**circulatory** **system** [´sз:kјulətəri] – кровеносная система

**nervous system** [´nз:vəs] – нервная система

**reproductive system** [ ri:prə´dʌktiv] – репродуктивная система (органы размножения)

**to gulp** [gʌlp] – глотать

**to pump over** [pʌmp] – прокачивать

**gill chamber** [´t∫eimbə] – жаберная полость

**filament** [´filəmənt] – нить, волокно, волосок

**gill arch** [´a:t∫] – жаберная дуга

**gill slit** [slit] – жаберная щель

**flap** [flæp] – клапан, пластинка, пластинчатый вырост

**gill cover** – жаберная крышка

**opening** – отверстие, щель

**8.2. Read the text and answer the questions.**

The internal organs of fish, like those of other vertebrates, are grouped into various systems according to the function they serve. The major systems include the **respiratory**, **digestive**, **circulatory**, **nervous**, and **reproductive** systems. Some of these systems resemble those of other vertebrates, but others differ in many ways.

**RESPIRATORY SYSTEM**

Unlike land animals, almost all fish get their oxygen from water. Water contains a certain amount of dissolved oxygen. To get oxygen, fish **gulp** water through the mouth and **pump** it **over** the gills. Most fish have four pairs of gills enclosed in a **gill chamber** on each side of the head. Each gill consists of two rows of fleshy **filaments** attached to a **gill arch**. Water passes into the gill chambers through **gill slits**. A **flap** of bone called a **gill cover** protects the gills of bony fish. Sharks and rays do not have gill covers. Their gill slits form visible **openings** on the outside of the body.

In a bony fish, the breathing process begins when the gill covers close and the mouth opens. At the same time, the walls of the mouth expand outward, drawing water into the mouth. The walls of the mouth then move inward, the mouth closes, and the gill covers open. This action forces the water from the mouth into the gill chambers. In each chamber, the water passes over the gill filaments. They absorb oxygen from the water and replace it with carbon dioxide formed during the breathing process. The water then passes out through the gill openings, and the process is repeated.

*1. Where do almost all fish get their oxygen from?*

*2. What do fish do to get oxygen?*

*3. What do gills consist of?*

*4. How does water pass into the gill chambers?*

*5. Where are the gills situated?*

*6. What protects the gills of bony fish?*

*7. What protects the gill slits of sharks and rays?*

*8. What stages does the breathing process in a bony fish consist of?*

*9. What happens when the water passes over the gill filaments?*

**8.3. Complete the following sentences using the prompts.**

|  |
| --- |
| *a gill cover a gill arch water fleshy filaments the head* *the gills the mouth dissolved oxygen a gill slit*1. Almost all fish get their oxygen from \_\_\_\_\_\_\_\_\_\_.
2. Water contains a certain amount of ­­­\_\_\_\_\_\_\_\_\_\_\_.
3. Fish gulp water through \_\_\_\_\_\_\_\_\_\_ .
4. Fish pump water over \_\_\_\_\_\_\_\_\_\_ .
5. Gill chambers are situated on each side of ­­­­\_\_\_\_\_\_\_\_\_\_ .
6. Each gill is composed of two rows of \_\_\_\_\_\_\_\_\_\_ .
7. Gill filaments are attached to \_\_\_\_\_\_\_\_\_\_\_ .
8. Water passes into gill chambers through \_\_\_\_\_\_\_\_\_\_ .
9. The gills of bony fish are protected by \_\_\_\_\_\_\_\_\_\_ .

**8.4. Before reading the text learn the words below.** **Practise the pronunciation.** |

**to nourish** [**´**nʌri∫] **–** питать, кормить

**to eliminate** [i´limineit] **–** устранять

**anus** [´einəs] – задний проход

**anal fin** [´einl] – анальный плавник

**tongue** [tʌŋ] – язык

**to seize** [si:z] – хватать, захватывать

**to tear (tore, torn) off** [´teə] – рвать, отрывать, отдирать

**victim** [´viktim] – жертва

**pharynx** [´færiŋks] – глотка, зев

**to crush** [´krʌ∫] – дробить, размельчать

**to grind** [´graind] – молоть, перемалывать, растирать

**esohpagus** [i:´sɔ:fəgəs] – пищевод

**tubelike** – трубковидный

**to swallow** [´swɔləu] – глотать, проглатывать

**whole** [´həul] – целиком

**stomach**  [´stʌmək] – желудок

**to digest** [dai´ʤest] – переваривать

**gizzard** [´gizəd] – второй желудок

**waste products –**  отходы

**undigested** [ ʌndi´ʤestid] – непереваренный

**8.5. Read the text and answer the questions.**

**DIGESTIVE SYSTEM**

Digestive system, or digestive tract, changes food into materials that **nourish** the body cells. It **eliminates** materials that are not used. In fish, this system leads from the mouth to the **anus**, an opening in front of the **anal fin**. Most fish have a jawed mouth with a **tongue** and teeth. A fish cannot move its tongue. Most fish have their teeth rooted in the jaws. They use their teeth **to seize** prey or **to tear off** pieces of their **victim**'s flesh. Some of them also have teeth on the roof of the mouth or on the tongue. Most fish also have teeth in the **pharynx**, a short tube behind the mouth. They use these teeth **to crush** or **grind** food.

*1. What function does the digestive tract perform?*

*2. Where does* *the digestive tract begin?*

*3. Are there any teeth in the mouth of most fish?*

*4. Where are the teeth situated?*

*5. What do most fish use their teeth for?*

In all fish, food passes through the pharynx on the way to the **esophagus**, another **tubelike** organ. A fish's esophagus expands easily, which allows the fish **to swallow** its food **whole**. From the esophagus, food passes into the **stomach**, where it **is** partly **digested**. Some fish have their esophagus or stomach enlarged into a **gizzard**. The gizzard grinds food into small pieces before it passes into the intestines. The digestive process is completed in the intestines. The digested food enters the blood stream. **Waste products** and **undigested food** pass out through the anus.

*6. Where does food go from the pharynx?*

*7. What makes it possible for fish to swallow its food whole?*

*8. Where does food pass into from the esophagus?*

*9. What happens to food in the stomach and in the gizzard?*

*10. Where is the digestive process completed?*

*11. What does the digested food enter?*

*12. What passes through the anus?*

**8.5. Match the internal organs with their functions.**

|  |  |
| --- | --- |
| 1) the teeth in the mouth2) the teeth in the pharynx3) the stomach4) the gizzard5) the intestines6) the anus | a) to partly digest foodb) to seize prey and tear off pieces of victim’s fleshc) to crush or grind foodd) to pass out waste products and undigested foode) to grind food into small piecesf) to complete the digestive process |

**8.6. Give the English equivalents for the following expressions.**

1) Пищеварительный тракт; 2) зубы, расположенные на челюстях; 3) зубы, расположенные на небных костях ротовой полости; 4) короткая трубка позади ротовой полости; 5) отверстие перед анальным плавником; 6) легко расширяется; 7) пища поступает в желудок; 8) пища поступает в кишечник; 9) непереваренная пища.

**8.7. Learn the words before reading the text.**

**blood vessel** [´blʌd ´vesl] – кровеносный сосуд

**atrium** [´a:triəm] – предсердие, атриум

**ventricle** [´ventrikl] – желудочек (сердца)

**vein** [´vein] – вена, кровеносный сосуд

**artery** [´a:təri] – артерия

**kidney** [´kidni] – почка

**8.7. Read the text and answer the questions.**

**CIRCULATORY SYSTEM**

Circulatory system distributes blood to all parts of the body. It includes the heart and **blood vessels**. A fish's heart consists of two main chambers--**the atrium** and **the ventricle**. The blood flows through **veins** to the atrium. It then passes to the ventricle. Muscles in the ventricle pump the blood through arteries to the gills, where the blood receives oxygen and gives off carbon dioxide. **Arteries** then carry the blood throughout the body. The blood carries food from the intestines and oxygen from the gills to the body cells. It also carries away waste products from the cells. A fish's **kidneys** remove the waste products from the blood, which returns to the heart through the veins.

*1. What does circulatory system consist of?*

*2. What function does it perform?*

*3. How many chambers are there in a fish’s heart?*

*4. What does the blood carry?*

*5. Where does the blood receive oxygen and give off carbon dioxide?*

*6. What waste products does the blood carry away?*

*7. What organ removes the waste products from the blood?*

**8.8. Insert the necessary prepositions.**

|  |
| --- |
| ***through to off throughout from away in*** |

1. The blood flows \_\_\_\_\_ veins \_\_\_\_\_ the atrium.
2. The blood then passes \_\_\_\_\_ the ventricle.
3. Muscles \_\_\_ the ventricle pump the blood \_\_\_ arteries \_\_\_\_\_ the gills.
4. \_\_\_\_\_the gills the blood receives oxygen and gives \_\_\_ carbon dioxide.
5. The blood carries food \_\_\_\_\_ the intestines and oxygen \_\_\_\_\_ the gills \_\_\_\_\_ the body cells.
6. The blood also carries \_\_\_\_\_ waste products \_\_\_\_\_ the cells.

**8.9. Learn the new words before reading the text. Practise their pronunciation.**

**spinal cord** [´spainl´kɔ:d] – спинной мозг

**soft nerve tissue** [´sɔ:ft´nз:v´ti∫u:] – мягкая нервная ткань

**backbone** [´bækboun] – спинной хребет, позвоночник

**enlargement** [in´la:ʤmənt] – увеличение, расширение, утолщение

**to extend** [ik´stend] – протягивать(ся), удлинять(ся)

**sensory nerves** [´sensəri] – сенсорные, чувствительные нервы

**to carry messages** – проводить возбуждения

**sense organ**  – орган чувств

**motor nerves** – двигательные, моторные нервы

**consciously** [´kɔn∫əsli] – осознанно, сознательно

**conscious control** [´kɔn∫əs] – осознанный контроль

**skeletal muscles** [´mʌslz] – скелетные мышцы

**smooth muscles** [´smu:θ ´mʌslz] – гладкие мышцы

**8.9. Read the text and answer the questions.**

**NERVOUS SYSTEM**

Nervous system of fish, like that of other vertebrates, consists of a **spinal cord**, brain, and nerves. However, a fish's nervous system is not so complex as that of mammals and other higher vertebrates. The spinal cord, which consists of **soft nerve tissue**, runs from the brain through the **backbone**. The brain is an **enlargement** of the spinal cord and is enclosed in the skull. The nerves **extend** from the brain and spinal cord to every part of the body. Some nerves, called **sensory nerves**, **carry messages** from the **sense organs** to the spinal cord and brain. Other nerves, called **motor nerves**, carry messages from the brain and spinal cord to the muscles. A fish can **consciously** control its **skeletal muscles**. But it has no **conscious control** over the smooth muscles and heart muscles. These muscles work automatically.

*1. What does the nervous system of fish include?*

*2. What does the spinal cord consist of?*

*3. What is the brain?*

*4. How does the brain receive and carry messages?*

*5. What nerves carry messages from the sense organs to the brain and the spinal cord?*

*6. What nerves carry messages from the brain and spinal cord to the muscles?*

*7. What muscles can a fish control consciously?*

*8. What muscles work automatically?*

**8.10. Complete the sentences using the active vocabulary. Translate them into Russian.**

1. Nervous system consists of \_\_\_\_\_\_\_\_\_\_ .
2. The spinal cord ­­­\_\_\_\_\_\_\_\_\_\_\_ soft nerve tissue.
3. The spinal cord runs from the brain through the \_\_\_\_\_\_\_\_\_\_\_ .
4. The brain is an \_\_\_\_\_\_\_\_\_\_\_ of the spinal cord.
5. The brain is \_\_\_\_\_\_\_\_\_\_ in the skull.
6. The nerves \_\_\_\_\_\_\_\_\_\_ from the brain and spinal cord to every part of the body.
7. Sensory nerves carry messages from the \_\_\_\_\_\_\_\_\_\_ to the spinal cord and the brain.
8. Motor nerves \_\_\_\_\_\_\_\_\_\_ from the brain and spinal cord to the muscles.
9. A fish can consciously control its \_\_\_\_\_\_\_\_\_\_ muscles.
10. Fish has no \_\_\_\_\_\_\_\_\_ control over smooth muscles and heart muscles.

**8.11. Learn the words before reading the text.**

**reproductive organs** – органы размножения

**testes** (*pl.*) [´testi:z], **testis** (*sing.*) [´testis] – (*анат.*) яички, яичко

**ovary** [´əuvəri] – яичник

**fluid** [´flu:id] – жидкость

**milt** [milt], *тж.* **soft roe** [´rəu] – семенники (рыб), молоки

**to milt** – оплодотворять

**roe** [´rəu], *тж.* **hard roe** – икра

**spawn** [´spɔ:n] – икра

**to spawn** – метать икру

**clasper** [´kla:spə] – усик, крючок

**8.12. Read the text and answer the questions.**

**REPRODUCTIVE SYSTEM**

As in all vertebrates, the **reproductive organs** of fish are **testes** in males and **ovaries** in females. The testes produce male sex cells, or sperm. The sperm is contained in a **fluid** called **milt**. The ovaries produce female sex cells, or eggs. Fish eggs are also called **roe** or **spawn**. Most fish release their sex cells into the water through an opening near the anus. The males of some species have special structures for transferring sperm directly into the females. Male sharks, for example, have such a structure, called a **clasper**, on each pelvic fin. The claspers are used to insert sperm into the female's body.

*1. What reproductive organs do fish have?*

*2. What is the function of the testes?*

*3. Where is the sperm contained?*

*4. What do the ovaries produce?*

*5. What do we call fish eggs?*

**UNIT 9**

**SPECIAL ORGANS**

**9.1. Before reading the text practise the pronunciation of the following words.**

**buoyant** [´bɔiənt] – плавучий, способный держаться на воде;

**buoyancy** [´bɔiənsi] – плавучесть, способность держаться на воде;

**swim bladder**, *тж.* **swimming bladde**r [´blædə] – плавательный пузырь

**9.2. Translate the expressions given below into Russian.**

1. a baglike organ
2. to provide buoyancy
3. to gain buoyancy
4. to maintain buoyancy
5. to reduce buoyancy
6. to keep buoyant
7. air bladder
8. bottom-dwelling fish
9. deep-sea fish
10. to attract prey

**9.3. Read the text and answer the question: *What special organs can be found in many fish?***

Most bony fish have a **swim bladder** below the backbone. This baglike organ is also called an **air bladder**. In most fish, the swim bladder provides **buoyancy**, which enables the fish to remain at a particular depth in the water. In **lungfish** and a few other fish, the swim bladder serves as an **air-breathing lung**. Still other fish, including many catfish, use their swim bladders to produce sounds as well as to provide buoyancy. Some species communicate by means of such sounds.

A fish would **sink** to the bottom if it did not have a way of **keeping buoyant**. Most fish **gain buoyancy** by **inflating** their swim bladder with gases produced by their blood. But water pressure increases with depth. As a fish swims deeper, the increased water pressure makes its swim bladder smaller and so **reduces** the fish's **buoyancy**. The amount of gas in the bladder must be increased so that the bladder remains large enough **to maintain buoyancy**. A fish's nervous system automatically regulates the amount of gas in the bladder so that it is kept properly filled. Sharks and rays do not have a swim bladder. **To keep buoyant**, these fish must swim constantly. When they rest, they stop swimming and so **sink** toward the bottom. Many bottom-dwelling bony fish also **lack** a swim bladder.

Many fish have organs that produce light or electricity. But these organs are simply adaptations of structures found in all or most fish. For example, many deep-sea fish have **light-producing organs** developed from parts of their skin or digestive tract. Some species use these organs to attract prey or possibly to communicate with others of their species. Various other fish have **electricity-producing organs** developed from muscles in their eyes, gills, or trunk. Some species use these organs **to stun** or kill enemies or prey.

**VOCABULARY**

**lungfish** – двоякодышащая рыба

**air-breathing lung** – лёгкое для дыхания атмосферным воздухом

**to inflate** – надувать, наполнять газом, накачивать

**to sink** – погружаться, тонуть, идти на дно

**to lack –** не иметь чего-либо

**light-producing organs** – органы свечения

**electricity-producing organs** – электрические органы

**to stun** – оглушать

**9.4. Answer the questions about the text.**

1. Where is a swim bladder situated?
2. What functions does a swim bladder perform?
3. Do all fish have a swim bladder?
4. What do sharks and rays do to keep buoyant?
5. How does a swim bladder help fish to keep buoyant?
6. What is the function of light-producing organs?
7. How do some species use electricity-producing organs?
8. How did light-producing and electricity-producing organs develop?

**9.5. Put the words in the box in the right column.**

|  |
| --- |
| Gills testes blood vessels dissolved oxygen ovary swimming bladder brain motor nerves pharynx heart lungs sperm light-producing organs esophagus tongue spinal cord stomach atrium filaments gizzard soft nerve tissue ventricle spawn / roe carbon dioxide electricity-producing organs sensory nerves intestines veins milt buoyancy teeth arteries |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Respiratory system | Digestive system | Circulatory system | Reproductive system | Special organs | Nervous system |
|  |  |  |  |  |  |

**UNIT 10**

**THE SENSES OF FISH**

**10.1. Learn the expressions before reading the text. Practise their pronunciation.**

**sense organs** – органы чувств

**lateral line system** – органы боковой линии, органы сейсмосенсорного чувства

**to meet the conditions of life underwater** – удовлетворять условиям жизни под водой

**sight** [sait] – зрение

**vision** [viʒn] – зрение

**moist** [mɔist] – влажный

**to moisten** [´mɔisn] – увлажнять , *ср*. **to keep moist**

**moisture** [´mɔist∫ə] – влажность

**blind** [´blaind] – слепой

* 1. **Read the paragraph below and answer the questions:**

***1. What sense organs do fish have?***

***2.* *Why do fish have some special sense organs?***

Like all vertebrates, fish have **sense organs** that tell them what is happening in their environment. The organs enable them to see, hear, smell, taste, and touch. In addition, almost all fish have a special sense organ called the **lateral line system**, which enables them to "touch" objects at a distance. Fish also have various other senses that help them **meet the conditions of life underwater**.

**10.3. Read the extract below and find the answer to the question: *In what way do a fish’s eyes differ from the eyes of land vertebrates?***

**SIGHT**

 A fish's eyes differ from those of land vertebrates in several ways. For example, most fish can see to the right and to the left at the same time. This ability **makes up** in part **for** the fact that a fish has no neck and so cannot turn its head. Fish also lack **eyelids**. In land vertebrates, eyelids help moisten the eyes and **shield** them from sunlight. A fish's eyes are kept moist by the flow of water over them. They do not need to be shielded from sunlight because sunlight is seldom extremely bright underwater. Some fish have unusual adaptations of the eye. For example, adult **flatfish** have both eyes on the same side of the head. A flatfish spends most of the time lying on its side on the ocean floor and so needs eyes only on the side that **faces upward**. The eyes of certain deep-sea fish are on the ends of short structures that stick out from the head. These structures can be raised upward, allowing the fish to see overhead as well as to the sides and front.

A few kinds of fish are born blind. They include certain species of catfish that live in total darkness in the waters of caves and the **whalefish**, which lives in the ocean depths. Some of these fish have eyes but no vision. Others lack eyes completely.

**Vocabulary**

**to make up for** – возмещать, компенсировать

**eyelid** – глазное веко

**to shield** – защищать, заслонять, укрывать

**flatfish** – плоская рыба (палтус, камбала и т.д.)

**to face upwards** – смотреть вверх

**whalefish** – китовидковая рыба

**10.4. Give the English equivalents of the following expressions.**

1) В одно и то же время, одновременно; 2) на одной и той же стороне головы; 3) частично; 4) наземные позвоночные; 5) увлажнять глаза; 6) защищать глаза от солнечного света; 7) на дне океана; 8) глубоководная рыба; 9) родиться слепым; 10) жить в абсолютной темноте; 11) обитать в океанских глубинах; 12) иметь глаза, но не обладать способностью видеть; 13) совсем не иметь глаз.

**10.5. Answer the questions.**

1. Why do most fish have the ability to see to the right and to the left at the same time?
2. What do land vertebrates need eyelids for?
3. Why don’t fish need eyelids?
4. Why do adult flatfish have both eyes on the same side of the head?
5. What unusual adaptation of the eye do some deep-fish have?
6. What kinds of fish are born blind? Why?

**10.6. Read the paragraph about hearing and answer the questions after the text. Learn the words before reading.**

**a keen sense of hearing** – острый слух

**poutch** [´paut∫] – полый мешочек

**outer ear** – наружное ухо

**inner ear** – внутреннее ухо

**eardrums** – барабанные перепонки

**sound vibrations** – звуковые колебания

**HEARING**

All fish can probably hear sounds produced in the water. Fish can also hear sounds made on shore or above the water if they are loud enough. Catfish and certain other fish have **a keen sense of hearing**.

Fish have an inner ear enclosed in a chamber on each side of the head. Each ear consists of a group of **pouches** and tubelike canals. Fish have no **outer ears** or **eardrums** to receive sound vibrations. **Sound vibrations** are carried to the **inner ears** by the body tissues.

*1. Can fish hear?*

*2. What sounds can fish hear?*

*3. What organ enables fish to hear?*

*4. How do fish receive sound vibrations?*

 **10.7. Learn the words before reading the following paragraph, then read the text and answer the questions after it.**

**smell** – обоняние

**olfactory organs** – органы обоняния

**snout** [´snaut] – рыло

**pouch** [´paut∫] – мешок, полость

**to be lined** – быть выстланным изнутри

**odour** – запах, аромат

**nostril** – ноздря

**taste** – вкус

**tastebud** – вкусовая почка

**whiskerlike** – похожий на усы

**feeler** – щупальце, усик

**barbel** [´ba:bl] – усик (у некоторых рыб)

**SMELL AND TASTE**

All fish have a sense of smell. It is highly developed in many species, including catfish, salmon, and sharks. In most fish, the **olfactory organs** (organs of smell) consist of two **pouches**, one on each side of the snout. The pouches are lined with nerve tissue that is highly sensitive to odours from substances in the water. A nostril at the front of each pouch allows water to enter the pouch and pass over the tissue. The water leaves the pouch through a nostril at the back.

Most fish have taste buds in various parts of the mouth. Some species also have them on other parts of the body. Catfish, sturgeon, and a number of other fish have whiskerlike feelers called barbels near the mouth. They use the barbels both to taste and to touch.

*1. Is a sense of smell developed in fish?*

*2. What do the olfactory organs consist of?*

*3. Do all fish have organs of taste?*

*4. What do organs of taste look like?*

**10.8. Learn the words before reading the next paragraph.**

**touch** –осязание

**nerve endings** – нервные окончания

**to sense** – ощущать

**sensitive areas** – чувствительные области

**to relay** – передавать (дальше)

**range of vision** – поле зрения

**10.9. Read the paragraph and answer the question: *What is the role of the lateral line system?***

**TOUCH AND THE LATERAL LINE SYSTEM**

Touch and the lateral line system are closely related. Most fish have a well-developed sense of touch. Nerve endings throughout the skin react to the slightest pressure and change of temperature. The lateral line system senses changes in the movement of water. It consists mainly of a series of tiny canals under the skin. A main canal runs along each side of the trunk. Branches of these two canals extend onto the head. A fish senses the flow of water around it as a series of vibrations. The vibrations enter the lateral line through pores and activate certain sensitive areas in the line. If the flow of water around a fish changes, the pattern of vibrations sensed through the lateral line also changes. Nerves relay this information to the brain. Changes in the pattern of vibrations may warn a fish of approaching danger or indicate the location of objects outside its range of vision.

**10.10. Give the English equivalents of the following expressions.**

1. хорошо развитое чувство осязания
2. нервные окончания
3. реагировать на малейшее давление
4. изменения в движении воды
5. серия крохотных каналов под кожей
6. тянуться вдоль каждой стороны туловища
7. изменения в характере колебаний
8. предупредить о надвигающейся опасности
9. указывать на расположение объекта за пределами поля зрения

**10.11. Read the text below and answer the questions.**

**OTHER SENSES**

Other senses include those that help a fish keep its balance and avoid unfavorable waters. The inner ears help a fish keep its balance. They contain a fluid and several hard, free-moving otoliths (ear stones). Whenever a fish begins to swim in other than an upright, level position, the fluid and otoliths move over sensitive nerve endings in the ears. The nerves signal the brain about the changes in the position of the body. The brain then sends messages to the fin muscles, which move to restore the fish's balance. Fish can also sense any changes in the pressure, salt content, or temperature of the water and so avoid swimming very far into unfavorable waters.

*1. What other senses do fish have?*

*2. What organ helps a fish to keep its balance?*

*3. How can a fish avoid swimming far into unfavourable waters?*

**UNIT 11**

**HOW FISH LIVE**

**11.1. Learn the words before reading the text.**

**embryo** [´embriəu] – эмбрион

**to feed on smth** – питаться чем-либо

**yoke** [јəuk] **–** желток

**to hatch** – вылупиться, вылупляться

**larva** (*pl.***larvae**) [´la:və] – личинка, личинки

**fry** [frai] – мелкая рыбёшка

**adulthood** – зрелый возраст

**juvenile** [´ʤu:vənail] – юношеский, молодой

**11.2. Read the text and answer the questions after it.**

Every fish begins life in an egg. In the egg, the undeveloped fish, called an **embryo**, feeds on the **yolk** until ready **to hatch**. After a fish hatches, it is called a **larva** or **fry**. The fish reaches **adulthood** when it begins to produce sperm or eggs. Most small fish, such as guppies and many minnows, become adults within a few months after **hatching**. But some small fish become adults only a few minutes after hatching. Large fish require several years. Many of these fish pass through one or more **juvenile stages** before becoming adults. Almost all fish continue to grow as long as they live. During its lifetime, a fish may increase several thousand times in size. The longest-lived fish are probably certain sturgeon, some of which have lived in aquariums more than 50 years.

*1. What is an embryo?*

*2. What is called larva or fry?*

*3. When do fish become adults?*

*4. What are the longest-lived fish?*

**11.3. Read the following paragraphs and answer the questions.**

**HOW FISH GET FOOD**

Most fish are **carnivores** (meat-eaters). They eat **shellfish**, **worms**, and other kinds of water animals. Above all, they eat other fish. They sometimes eat their own young. Some fish are mainly **herbivores** (plant-eaters). They chiefly eat **algae** and other water plants. But most plant-eating fish probably also eat animals. Some fish live mainly on plankton. They include many kinds of flying fish and herring and the three largest fish of all – the whale shark, giant manta ray, and **basking shark**. Some fish are **scavengers**. They feed mainly on waste products and on the dead bodies of animals that sink to the bottom.

*1. What do most fish feed on?*

*2. What fish live mainly on plankton?*

*3. What do scavengers feed on?*

Many fish have body organs specially adapted for **capturing food**. Certain fish of the ocean depths attract their prey with **flashing lures**. The dorsal fin of some anglerfish **dangles** above their mouth and serves as **a bait** for other fish. Such species as gars and swordfish have long, **beaklike** **jaws**, which they use for **spearing** or **slashing** their prey. Barracudas and certain piranhas and sharks are well known for their razor-sharp teeth, with which they tear the flesh from their victims. Electric eels and some other fish with electricity-producing organs stun their prey with an electric shock. Many fish have **comblike** **gill rakers**. These structures **strain** plankton from the water pumped through the gills.

*4. How do fish capture food?*

*5. What body organs are used for capturing food?*

**VOCABULARY**

**carnivores** [´ka:nivɔ:z] – плотоядные

**shellfish** – моллюск

**worm** [wз:m] – червяк, червь

**herbivores** [´hз:bivɔ:z] – травоядные

**algae** [´ælʤi:] (*sing.***alga** [´ælgə]) **–** водоросли, водоросль

**basking shark** – гигантская акула

**scavenger** [´skævinʤə] – чистильщик, рыба, питающаяся падалью

**to capture** – ловить, захватывать

**flashing lure** [´l(j)uə] – вабик, приманка

**to dangle** [´dæŋgl] – свисать, болтаться

**bait** [beit] – приманка, наживка

**beaklike jaws** – клювообразные челюсти

**to spear** [spiə] – пронзать (копьём)

**to slash** [slæ∫]– рубить (саблей), полосовать

**gill rakers** – жаберная сетка, жаберное «сито»

**to strain** [strein] – процеживать

**11.4. Match the fish and the organ they use for capturing food.**

|  |  |
| --- | --- |
| **fish** | **body organ** |
| 1) gars, swordfish | a) razor-sharp teeth |
| 2) anglerfish | b) comblike gill rakers |
| 1. barracudas, piranhas
 | 1. electricity-producing organs
 |
| 1. deep-sea fish
 | 1. long beaklike jaws
 |
| 1. electric eel
 | 1. the dorsal fin
 |
| 1. herring, flying fish
 | 1. flashing lure
 |

**11.5. Use the table and the prompts given below to describe how fish get food.**

* to attract prey
* to dangle above one’s mouth as a bait for other fish
* to spear or to slash the prey
* to tear flesh from the victim
* to stun the prey with electric shock
* to strain plankton from the water pumped through gills

**11.6. Read the next passage and answer the questions after each paragraph.**

**HOW FISH PROTECT THEMSELVES**

All fish, except the largest ones, live in constant danger of being attacked and eaten by other fish or other animals. To survive, fish must be able to defend themselves against predators. If a species loses more individuals each generation than it gains, it will in time die out.

*1. Why must fish protect themselves?*

Protective coloration and protective resemblance are the most common methods of self-defence. A fish that blends with its surroundings is more likely to escape from its enemies than one whose colour or shape is extremely noticeable. Many fish that do not blend with their surroundings depend on swimming speed or manoeuvring ability to escape from their enemies.

*2. What are the most common methods of self-defence?*

*3. How do fish without protective coloration escape from*

*their enemies?*

Fish also have other kinds of defence. Some fish, such as gars, pipefish, and seahorses, are protected by a covering of thick, heavy scales or bony plates. Other species have sharp spines that are difficult for predators to swallow. In many of these species, including scorpionfish, sting rays, and stonefish, one or more of the spines are poisonous. When threatened, the porcupine fish inflates its spine-covered body with air or water until it is shaped like a balloon. The fish's larger size and erect spines may discourage an enemy. Many eels that live on the bottom dig holes in which they hide from their enemies. Razor fish dive into sand on the bottom. A few fish do the opposite. For example, flying fish and needlefish escape danger by propelling themselves out of the water.

*4. What other methods do fish use to defend themselves against predators?*

 **11.7. Find in the text the English equivalents of the following expressions.**

1) Защитная окраска; 2) покровительственное сходство; 3) сливаться с окружающей средой; 4) защищаться от хищников; 5) через некоторое время; 6) методы самозащиты; 7) удрать от врага; 8) очень заметная окраска; 9) толстая чешуя; 10) костные пластины; 11) острые шипы; 12) ядовитые шипы; 13) тело, покрытое шипами; 14) копать норы; 15) прятаться от врагов; 16) избежать опасности; 17) вымереть; 18) жить в постоянной опасности; 19) выжить; 20) при угрозе; 21) виды защиты; 22) обескуражить, сбить врага с толку; 23) нырять /зарываться/ в песок.

**11.8. Correct the following statements.**

1. A fish whose colour or shape is extremely noticeable is more likely to escape from its enemies.
2. Eels protect themselves with the help of sharp spines that are difficult for predators to swallow.
3. Porcupine fish dig holes in which they hide from their enemies.
4. Flying fish are protected by a covering of thick, heavy scales.
5. Razor fish escape danger by propelling themselves out of the water.
6. When threatened seahorses and pipefish dive into sand on the bottom.
7. Some fish, such as gars, erect spines to discourage an enemy.

**11.9. Complete the table writing out the key expressions from the text.**

|  |  |
| --- | --- |
| **Fish** | **Methods of defence** |
| 1. most fish
 | – protective coloration– protective resemblance |
| 1. fish with noticeable colour or shape
 | – swimming speed– manoeuvring ability |
| 1. gars, pipefish, seahorses
 |  |
| 1. scorpionfish, sting rays, stonefish
 |  |
| 1. porcupine fish
 |  |
| 1. eels
 |  |
| 1. razor fish
 |  |
| 1. flying fish, needlefish
 |   |

**11.10. Make use of the table and explain to your group mates how fish protect themselves.**

**UNIT 12**

**HOW FISH LIVE TOGETHER**

**12.1. Read the text and answer the questions after each paragraph.**

Among many species, the individual fish that make up the species live mainly by themselves. Such fish include most predatory fish. Many sharks, for example, hunt and feed by themselves and join other sharks only for mating.

*1. What fish don’t form schools?*

*2. When do sharks join other sharks?*

Among many other species, the fish live together in closely-knit groups called schools. About a fifth of all fish species are schooling species. A school may have few or many fish. A school of tuna, for example, may consist of fewer than 25 individuals. Many schools of herring number in the hundreds of millions. All the fish in a school are about the same size. Baby fish and adult fish are never in the same school. In some schooling species, the fish become part of a school when they are young and remain with it throughout their lives. Other species form schools for only a few weeks after they hatch. The fish in a school usually travel in close formation as a defence against predators. But a school often breaks up at night to feed and then regroups the next morning. The approach of a predator brings the fish quickly back together.

*3. What is a school?*

*4. How many fish do schools number?*

*5. Can baby fish and adult fish be in the same school?*

*6. Why do the fish in a school usually travel in close formation?*

*7. Does a school sometimes break up? Why?*

Fish also form other types of relationships. Among cod, perch, and many other species, a number of individuals may gather in the same area for feeding, resting, or spawning. Such a group is only temporary and is not so closely knit as a school. Some fish, including certain angelfish and wrasses, form unusual relationships with larger fish of other species. In many such relationships, the smaller fish removes parasites or dead tissue from the larger fish. The smaller fish thus obtains food, and the other is cleaned.

*8. What other types of relationships can fish form?*

**12.2. Give the English equivalents of the following expressions.**

1) Хищная рыба; 2) спаривание; 3) тесно связанные группы; 4) косяк, стая; 5) виды рыбы, собирающейся в косяки; 6) приблизительно одинаковый размер; 7) в одном и том же косяке; 8) собираться в одном и том же районе; 9) нерест; 10) временная группа; 11) удалять мертвую ткань.

**UNIT 13**

**HOW FISH ADJUST TO CHANGE**

**13.1. Read the text and answer the questions after each paragraph.**

Fish sometimes need **to adjust** to changes in their environment. The two most common changes are (1) changes in water temperature and (2) changes in the **salt** **content** of water.

*1. What do fish have to adjust to?*

*2. What changes do fish need to adjust to?*

In general, the body temperature of each species of fish **equals** that of the water in which the species lives. If the water temperature rises or falls, a fish can adjust to the change because its body temperature changes **accordingly**. But the change in the water temperature must not be too great and must **occur** gradually. Most fish can adjust to a change in the water temperature of up to 15 degrees F. (8 degrees C) – if the change is not sudden. Water temperatures usually change slowly, and so there is time for a fish's body to make the necessary adjustment. But occasionally, the temperature drops suddenly and severely, killing many fish. In addition, freshwater fish **are** sometimes **endangered** by thermal pollution, which occurs when factories and electric power plants release hot water into rivers or lakes. The resulting increase in water temperature may be greater than most fish can adjust to.

*3. Why do fish adjust to changes in the water temperature?*

*4. What change in water temperature can fish adjust to?*

*5. Why can’t fish adjust to a sudden change in the water temperature?*

*6. What are freshwater fish sometimes endangered by? Why?*

*7. When does thermal pollution occur?*

Both fresh water and ocean water contain various salts, many of which fish need in their diet. But ocean water is far saltier than fresh water. Fish that migrate between the two must adjust to changes in the salt content of the water. Relatively few fish can make such an adjustment.

*8. What fish must adjust to changes in the salt content of the water?*

Both freshwater and saltwater fish have about the same amount of dissolved salts in their body fluids. But the body fluids of ocean fish are not so salty as the water in which the fish live. **Under certain circumstances**, water from a **weak** **solution** will flow into a strong solution. This natural process, called osmosis, takes place if the two solutions are separated by a membrane (thin layer) through which only the water can pass. The skin and gill membranes of fish are of this type. **For this reason**, marine fish constantly lose water from their body fluids into the stronger salt solution of the sea water. **To make up for** this loss, they drink much water. But ocean water contains more salt than marine fish need. The fish **pass** the extra salt **out** through their gills and through their digestive tract. Saltwater fish need all the water they drink. As a result, these fish produce only small amounts of **urine**.

*9. Why do fish have to adjust to the salt content of the water?*

*10. What is osmosis?*

*11. Why do marine fish constantly lose water from their body fluids?*

*12. Why do marine fish drink much water?*

*13. How do marine fish get rid of extra salt?*

Freshwater fish have the opposite problem with osmosis. Their body fluids are saltier than fresh water. As a result, the fish constantly absorb water through their membranes. In fact, freshwater fish absorb so much water that they do not need to drink any. Instead, the fish must get rid of the extra water that their bodies absorb. As a result, freshwater fish produce great quantities of urine.

*14. Why do freshwater fish constantly absorb water?*

*15. What do freshwater fish have to get rid of? Why?*

*16. How do freshwater fish pass out the extra water that their bodies absorb?*

**VOCABULARY**

**to adjust** [ə´ʤʌst] – приспособиться, приспосабливаться

**salt content** – содержание соли

**to equal –** равняться

**accordingly** – соответственно

**to occur** – происходить, случаться

**to be endangered** – подвергаться опасности

**under certain circumstances** – в определённых условиях

**weak solution** – слабый раствор

**for this reason** – по этой причине

**to make up for smth** – возместить

**to pass smth out** – выводить (из организма)

**urine** [´јuərin] – моча

**13.2. Translate the expressions given below into Russian.**

1) To adjust to changes in the environment; 2) to make the necessary adjustments; 3) the salt content of water; 4) to contain various salts; 5) water temperature; 6) the temperature falls; 7) the temperature rises; 8) thermal pollution; 9) the same amount of dissolved salts; 10) salty body fluids; 11) weak salt solution; 12) strong salt solution;13) to pass the extra salt out; 14) saltwater fish; 15) freshwater fish; 16) marine fish.

**13.3. Give the English equivalents of the following expressions.**

1) Соответственно; 2) вообще; 3) кроме того; 4) в определённых условиях (при определённых обстоятельствах); 5) по этой причине; 6) в результате; 7) фактически; 8) вместо этого.

**13.4. Choose the right word, adjective or adverb.**

|  |  |
| --- | --- |
| **natural – naturally****constant – constantly****gradual – gradually****sudden – suddenly****occasional – occasionally****severe – severely****slow – slowly****usual – usually** | a) French comes \_\_\_\_\_\_\_\_ to him. b) He has a \_\_\_\_\_\_\_\_ gift for it.a) I am tired of \_\_\_\_\_\_\_\_ rain. b) It is \_\_\_\_\_\_\_\_ raining.a) If there is a \_\_\_\_\_\_\_\_ increase in the water temperature, fish can adjust to this change.b) Most fish can adjust to a change in the water temperature if it occurs \_\_\_\_\_\_\_\_.a) A \_\_\_\_\_\_\_\_ decrease in the water temperature can kill many fish.b) If the water temperatures change \_\_\_\_\_\_\_\_ fish have no time to make the necessary adjustments.a) I’m not a heavy drinker, but I like the \_\_\_\_\_\_\_\_ glass of wine. b) I’m not a heavy drinker, but \_\_\_\_\_\_\_\_ I have a glass of wine.a) She received ­\_ head injuries in the accident.b) Being \_\_ disabled she couldn’t work at all.a) We moved \_\_\_ because of the heavy traffic. b) Heavy traffic made our journey very \_\_\_\_\_\_\_\_.a) Let’s meet at the \_\_\_\_\_\_\_ time. b) We \_\_\_\_\_\_\_\_ meet at 7 p.m. |

**13.5. Read the text and answer the question: *Why do crocodiles cry?***

**IS IT TRUE CROCODILES CRY?**

When somebody says a person is shedding crocodile tears, he or she means that a person is pretending to be sad. This expression began because some people once believed that crocodiles cried to make their victims come closer to see what was the matter. It is now known that crocodiles do cry, but for physical, rather than emotional reasons. Their kidneys are unable to get rid of all the salt that crocodiles take in, so glands in their head extract the salt and pass it out as tears.

Penguins and other seabirds that eat salty food and drink mostly salt water also must rid their bodies of salt, so they too have salt glands above their eyes. Their tears dribble down their bills and away.

*(From ‘Owl’s Question and Answer Book N 1”)*

**13.6. Match the Russian expressions and their English equivalents.**

|  |  |
| --- | --- |
| 1) проливать крокодиловы слёзы2) заставить жертву приблизиться3) притворяться грустным4) в чем дело5) скорее чем, а не6) сейчас известно, что…7) почки (*анат.*)8) железы (*анат.*)9) клюв | a) to pretend to be sadb) billc) rather thand) to shed crocodile tearse) kidneysf) what is (was) the matterg) to make the victim come closerh) it is now known that…i) glands |

**13.7. Explain to your partner why and how crocodiles and some seabirds get rid of salt in their bodies. Make use of the active vocabulary.**

**13.8.\* Read one more text about crocodiles. Choose the best word or phrase, A, B, C or D, which best fits each space.**

**SCIENTISTS LEARN FROM CROCODILES!**

From recent (1) \_\_\_\_\_\_\_ we know that crocodiles possess an extremely (2) \_\_\_\_\_\_\_ form of haemoglobin – the substance which carries oxygen in the blood. As a result, this has a direct (3) \_\_\_\_\_\_\_ on the length of time they can hold their breath and consequently their ability (4) \_\_\_\_\_\_\_ underwater for (5) \_\_\_\_\_\_\_ . This is very important because they drown their victims by holding them underwater.

When crocodiles hold their breath, their bodies produce a chemical signal which makes their haemoglobin give up more of its oxygen than (6) \_\_\_\_\_\_\_ . Crocodiles can then use that oxygen without any (7) \_\_\_\_\_\_\_ to breathe in more air.

Research workers (8) \_\_\_\_\_\_\_ are trying to reproduce this haemoglobin molecule in (9) \_\_\_\_\_\_\_ blood. Their work may eventually make it possible (10) \_\_\_\_\_\_\_ underwater for much longer. The (11) \_\_\_\_\_\_\_ is that this unusual form of haemoglobin may not be the only explanation why crocodiles can stay underwater for so long. (12) \_\_\_\_\_\_\_ this, however, the research is of great (13) \_\_\_\_\_\_\_ for the future and may even (14) \_\_\_\_\_\_\_ scientists to produce artificial blood. This is just another example of the way in which we can (15) \_\_\_\_\_\_\_ our own lives by studying animals.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| 1. | A) study | B) studying | C) studies | D) studyings |
| 2. | A) unique | B) unusual | C) unequalled | D) incomparable |
| 3. | A) affect | B) result | C) cause | D) effect |
| 4.  | A) to stay | B) for staying | C) of staying | D) stay |
| 5. | A) a long time | B) long times | C) long time | D) some long times |
| 6. | A) ordinary | B) regular | C) usual | D) typical |
| 7. | A) necessary | B) need | C) needs | D) necessities |
| 8. | A) nowadays | B) in nowadays | C) on nowadays | D) at nowadays |
| 9. | A) human | B) human’s | C) humane | D) humans |
| 10. | A) for someone swimming | B) that someone can swim | C) that someone will swim | D) for someone to swim |
| 11. | A) matter | B) problem | C) objection | D) question |
| 12. | A) Although | B) In spite | C) Despite | D) Though |
| 13. | A) worth | B) value | C) quality | D) excellence |
| 14. | A) aid | B) assist | C) help | D) benefit |
| 15. | A) increase | B) benefit | C) profit | D) improve |

(*From Longman Dictionary of Common Errors Workbook by J.B.Heaton, 1997*)

**UNIT 14**

**HOW FISH REPRODUCE**

**14.1. Practise the pronunciation and learn the words.**

**to fertilize** – оплодотворять

**fertilization** – оплодотворение

**external fertilization** – наружное оплодотворение

**internal fertilization** – внутреннее оплодотворение

**spawning** – нерест

**to give birth to living young** – рожать живых детёнышей

**to bear living young** – рожать, производить живых детёнышей

**14.2. Read the text and answer the questions.**

All fish reproduce sexually. In sexual reproduction, a sperm unites with an egg in a process called fertilization. The fertilized egg develops into a new individual. In almost all fish species, males produce sperm and females produce eggs. In a few species, the same individual produces both sperm and eggs.

*1. How do fish reproduce?*

*2. What process is called fertilization?*

*3. What fish produce sperm?*

*4. What fish produce eggs?*

The eggs of most fish are fertilized outside the female's body. A female releases her eggs into the water at the same time that a male releases his sperm. Some sperm come in contact with some of the eggs, and fertilization takes place. This process is called external fertilization. The entire process during which eggs and sperm are released into the water and the eggs are fertilized is called spawning. Almost all bony fish reproduce in this way.

*5. Where does external fertilization take place?*

*6. What is called spawning?*

Sharks, rays, chimaeras, and a few bony fish, such as guppies and mosquito fish, reproduce in a different manner. The eggs of these fish are fertilized inside the female, a process called internal fertilization. For internal fertilization to occur, males and females must mate. The males have special organs for transferring sperm into the females. After fertilization, the females of some species release their eggs into the water before they hatch. Other females hatch the eggs inside their bodies and so give birth to living young. Fish that bear living young include many sharks and rays, guppies, and some halfbeaks and scorpionfish.

*7. What process is called internal fertilization?*

*8. How does internal fertilization differ from external fertilization?*

*9. What fish give birth to living young?*

**14.3. Give the English equivalents of the following expressions.**

1) Оплодотворённое яйцо; 2) размножаться половым путём; 3) образовывать яйцеклетки; 4) выпускать яйцеклетки в воду; 5) спариваться; 6) выводиться (вылупляться); 7) нерест; 8) рожать живых детёнышей; 9) в то же время; 10) внешнее оплодотворение; 11) внутреннее оплодотворение.

**14.4. Insert the verbs in the appropriate form.**

**to release** (x 2) **to reproduce to develop to produce**

 **to hatch** (x 2) **to bear**

1. Most bony fish \_\_\_\_\_\_\_\_ sexually.
2. Females \_\_\_\_\_\_\_\_\_ eggs.
3. A female \_\_\_\_\_\_\_\_ her eggs into the water where they come into contact with sperm.
4. The fertilized egg \_\_\_\_\_\_\_\_ into a new individual.
5. After fertilization the females of some species \_\_\_\_\_\_\_\_ their eggs into water where they \_\_\_\_\_\_\_\_ .
6. Many sharks, rays and guppies \_\_\_\_\_\_\_\_ living young.
7. Some females \_\_\_\_\_\_\_\_ their eggs inside their bodies and so give birth to living young.

**14.5. Read the next passage and answer the questions.**

**PREPARATION FOR SPAWNING**

Most fish have a spawning season each year, during which they may spawn several times. But some tropical species breed throughout the year. The majority of fish spawn in spring or early summer, when the water is warm and the days are long. But certain cold-water fish, such as brook trout and Atlantic cod, spawn in fall or winter.

*1. When do most fish spawn?*

*2. Why do the majority of fish spawn in spring and early summer?*

*3. What season do brook trout and Atlantic cod spawn in?*

Most fish return to particular spawning grounds year after year. Many freshwater fish have to travel only a short distance to their spawning grounds. They may simply move from the deeper parts of a river or lake to shallow waters near shore But other fish may migrate tremendous distances to spawn. For example, European freshwater eels cross 3,000 miles (4,800 kilometres) of ocean to reach their spawning grounds in the western Atlantic.

*4. Where do most fish spawn?*

*5. Where do freshwater eel migrate to spawn?*

At their spawning grounds, the males and females of some species swim off in pairs to spawn. Among other species, the males and females spawn in groups. Many males and females tell each other apart by differences in appearance. The females of some species are larger than the males. Among other species, the males develop unusually bright colours during the spawning season. During the rest of the year, they look much like the females of their species. In some species, the males and females look so different that for many years scientists thought they belonged to different species. Among other fish, the sexes look so much alike that they can be told apart only by differences in their behaviour. For example, many males adopt a special type of courting behaviour to attract females. A courting male may swim round and round a female or perform a lively "dance" to attract her attention.

*6. How do many males and females tell each other apart?*

*7. How can males and females be told apart when the sexes* *look very much alike?*

Among some species, including cod, Siamese fighting fish, and certain gobies and sticklebacks, a male claims a territory for spawning and fights off any male intruders. Many fish, especially those that live in fresh water, build nests for their eggs. A male freshwater bass, for example, uses its tail fin to scoop out a nest on the bottom of a lake or stream.

 *8. How do some fish prepare for spawning?*

**14.6. Give the English equivalents of the expressions below.**

1) Метать икру; 2) нерестилище; 3) различать (по окраске, по особенностям поведения); 4) самец; 5) самка; 6) выглядеть (различно, одинаково); 7) привлекать внимание; 8) строить гнезда; 9) отгонять непрошеных гостей; 10) выкапывать гнездо на дне озера.

**14.7. Key to exercise 13.8.**

1) C, 2) B, 3) D, 4) A, 5) A, 6) C, 7) B, 8) A, 9) A, 10) D, 11) B, 12) C, 13) B, 14) C, 15) D.

**NAMES OF FISH AND WATER ANIMALS**

**alewife** – сельдь

**amberjack –** сериолы, желтохвосты

**anableps** – четырёхглазка

**anchovettas –** *см.* **anchovy**

**anchovy –**  анчоус, хамса, камса

**angelfish –** 1) морской ангел; 2) брама, длиннопёрый морской лещ

**anglerfish** – 1) удильщики; 2) морской чёрт

**archerfish** – брызгун, брызгуновые

**barracuda** – барракуда

**basking shark** – *см.* shark

**bass** – окунь

* **black bass –** форелеокунь

**blueback herring** – *см.* herring

**bluefish** – голубая рыба, пеламида

**bluegill** – солнечный окунь

**bonefish** – альбула

**bonito** – пеламида, сарда

**bowfins** – амия, ильная рыба

**bream** – лещ

**buffalo** – иктиобус, буффало

**bullhead** – подкаменщик, сомик

**butterfish** – маслюк, поронот

**butterfly fish** – рыба-бабочка

**carp** – карп

**catfish** – сом, сомообразные

**characin** – харациновая рыба

**chimaera** – химера

**chub** – голавль

**cichlid –** цихлиды, цихловые рыбы

**clam** – (съедобный) моллюск

**cod** – треска

**coelacanth** – целакантообразные

**crab** – краб

**crappie** – краппи

**cutlassfish** – волосохвостовидные

**darters** – мелкая пресноводная рыба

– **Johnny darters** – *тж.*

**dogfish** – налим

**dolphin** – дельфин

**drum** – горбылёвые, или крокеры

**eel** – угорь

* **electric eel** – электрический угорь
* **moray eel** – мурена

**eelpout** – бельдюга

**electric ray** – *см.* ray

**eulachon** – эвлахон, или талеихт (сем. корюшковые)

**fightingfish** – бойцовая рыба ?

**filefish** – спинороговые

**flatfish** – камбалообразные

**flounder** – камбаловые

**flying fish** – летучая рыба

**gar** – сарган, морская щука

**goby** – бычок

**goldfish** – серебряный карась

**grayling** – хариус

**grouper** – морской окунь

**grunion** – атерины-грунионы

**grunt** – рыбы-ворчуны

**guppy** – гуппи

**gurnard** – морской петух

**haddock** – пикша, треска

**hagfish** – миксина

**hake** – хек

**halibut** – белокорый палтус

**hammerhead** – *см.* **shark**

**herring** – сельдь

**icefish** – ледяная рыба

**jellyfish** – медуза

**jewfish** – крупный морской окунь, промикропс, джуфиш

**Johnny darters** – *см.* darters

**killifish** – атеринообразные, карпозубые

**lamprey** – минога

**lanternfish** – миктофообразные (глубоководные рыбы, имеющие органы свечения)

**loach** – голец

**lobster** – омар, рак

**lumpfish** – пинагор, воробей-рыба

**lungfish** – двоякодышащие

**mackerel** – скумбрия, макрель

**manta ray** – *см.* ray

**marlin** – марлинь

**menhaden** – менхаден

**milkfish** – ханос, ханосовые, или молочные, рыбы

**minnow** – пескарь, гольян, мелкая рыбёшка

**molly** – пецилиевые

**moray eel** – *см.* eel

**mormyrid** – клюворыл(ы )

**mosquito fish** – гамбузия

**mudskipper** – прыгун

**mullet** – кефаль

**muskellunge** – щука-маскинонг

**needlefish** – саргановые

**oarfish** – сельдяной король

**oyster –** устрица

**paddlefish** – вислонос

**parrotfish** – скаровая рыба

**perch** – окунь

**pickerel** – молодая или мелкая щука, щурёнок

**pike** – щука

**pilotfish** – рыба-лоцман

**pipefish** – морская игла

**piranha** – пиранья

**pollock** – сайда

**pompano** – трахинотус

**porcupinefish** – рыба-ёж

**porgy** – спаровые, морские караси

**porpoise** – морская свинья, дельфин

**puffer** – собака-рыба

**pupfish** – ципринодон

**rattail** – макрурус

**ray** – скат

* **electric ray**
* **manta ray** – скат рогач (манта)
* **sting ray** – скат дазиатис

**razor fish** – 1) рыба-бритва; 2) двустворчатый моллюск

**redfish** – красная нерка

**remora** – прилипаловые (ремора)

**roach** – плотва, вобла, тарань

**sailfish** – парусник

**salmon** – лосось, сёмга

**sardine** – сардина

**sawfish** – пила-рыба

**scallop** – гребешок, створчатая раковина

**scorpionfish** – скорпена, морской ёрш

**sculpin** – керчаки, или рогатковые

**seahorse** – морской конёк

**shad** – алоза, шэд (европейская сельдь)

**shark** – акула

* **basking shark** ­– гигантская акула
* **hammerhead** **shark**– акула-молот
* **whale shark –** китовая акула
* **white shark**

**shellfish** – 1) моллюски, 2) ракообразные

**shrimp** – шримс, мелкая креветка

**silversides** – кижуч, атеринка

**skate** – ромбовидный скат

**smelt** – корюшка

**snail –** улитка

**snapper** – лютианус

**sole** – морской язык, камбала, палтус

**spot** – *см.* drum

**sprat** – шпрот

**starfish** – морская звезда

**stickleback** – колюшка

**sting ray** – *см.* ray

**stonefish –** бородавчатка

**sturgeon** – осётр

**sucker** – чукучан, чукучановые рыбы; прилипало

**sunfish** – название рыб, имеющих круглую форму; ушастый окунь, рыба-луна

**swordfish** – меч-рыба

**tarpon** – тарпон

**tetras** – any of a number of brightly coloured, tropical American, characin fishes, often kept in aquariums

**tilefish** – лофолатилус

**toadfish** – фахак, опсанус (рыба-жаба?)

**tripod (spider fish)** – морской паук?

**trout** – форель

* **brook trout**
* **lake tout**
* **rainbow trout**

**tuna** – голубой тунец

**turbot** – белокорый палтус

**wahoo** – ваху

**walleye** – светлопёрый судак

**weakfish** – судачий горбыль

**whale** – кит

**whale shark** – *см.* shark

**white shark** – *см.* shark

**whitefish** – белая рыба, рыба с белым мясом (сиги, тресковые)

**wolffish** – полосатая зубатка

**wrasse** – губан

**GLOSSARY**

**abdomen** – брюшная полость, живот

**air bladder**  – *см.* **swim bladder**

**anal** – заднепроходный, анальный

**anus** – задний проход

**armour** – (*зоол.*) панцирь

**artery** – артерия

**atrium** – предсердие, атриум

**backbone** – спинной хребет, позвоночник

**backboned animals** – позвоночные животные

**barbel** – усик (некоторых рыб)

**blood vessel** – кровеносный сосуд

**brain case** – черепная коробка

**bristle** – (*n.*) щетина, (*v.*) ощетиниться

**buoyancy** – плавучесть, способность держаться на плаву

**buoyant** – плавучий, способный держаться на поверхности

**camouflage** – маскировка, камуфляж

**carry messages** – проводить возбуждения

**cartilage** – хрящ

**catch** – (*n.*) улов

**cell** – (*биол.*) клетка, ячейка

**chromatophores** – хроматофоры

**circulatory system** – кровеносная система

**digest** – (*v.*) переваривать

**digestive** – пищеварительный

**ear** – ухо

* **outer ear** – наружное ухо
* **inner ear** – внутреннее ухо

**eardrum** – барабанная перепонка

**enlargement** – увеличение, утолщение

**esophagus** – пищевод

**eyelid** – веко

**feeler** – щупальце, усик

**filament** – нить, волокно, волосок

**fin** – плавник

* **anal fin**– заднепроходный, анальный плавник
* **caudal fin** – хвостовой плавник
* **dorsal fin** – спинной, дорсальный, верхний плавник
* **lobed fin** – дольчатый, разделенный на доли плавник
* **median fin** – непарный плавник
* **paired fin** – парный плавник
* **pectoral fin** – грудной плавник
* **pelvic fin** – тазовый, брюшной, абдоминальный плавник
* **rayed fin**– лучевой плавник
* **shoulder fin** – брюшной, вентральный плавник
* **ventral fin** – *см.* **shoulder fin**

**fish**

* **anadromous fish** – анадромная, проходная рыба
* **bony fish** – костная рыба
* **catadromous fish –** катадромная, полупроходная рыба
* **jawed fish** – челюстная рыба
* **jawless fish** – бесчелюстная рыба

**fishing ground** – рыболовное место, тоня; рыболовный район

**flap** – клапан, пластина

**flexible** – гибкий, гнущийся

**fluid** – жидкость

**framework** – остов, корпус, каркас

**gills** – жабры

* **gill arch** – жаберная дуга
* **gill chamber** – жаберная полость
* **gill cover** – жаберная крышка
* **gill slit** – жаберная щель

**gizzard** – второй желудок

**hatch** – (*v.*) рождаться, вылупляться (из яйца), выводиться (о личинках)

**inflate** – (*v.*) надувать

**intestins** – кишки, кишечник

**jaw** – челюсть

**keratin** – кератин, роговое вещество

**kidney** – (*анат.*) почка

**larva**, *pl.* **larvae** – личинка, личинки

**lateral line system** – органы боковой линии

**lungfish** – двоякодышащая рыба

**milt** – семенники (рыб), молоки

**moisten** – (*v.*) увлажнять

**moisture** – влага

**mucus** – слизь

**muscle** – мускул

* **heart muscles** – сердечные мышцы
* **skeletal muscles** – скелетные мышцы
* **smooth muscles** – гладкие мышцы

**myomeres** – миомеры, мышечные сегменты

**neck** – шея

**nerve** – нерв

* **motor nerves** – двигательные, моторные нервы
* **sensory nerves** – чувствиткльные, сенсорные нервы

**nerve endings** – нервные окончания

**nostril** – ноздря

**organ** – орган

* **internal organs** – внутренние органы
* **digestive organs** – пищеварительные органы
* **electricity producing organs** – электрические органы
* **light organs** – органы свечения
* **light producing organs** – *тж.*
* **olfactory organs** – органы обоняния
* **reproductive organs** – органы размножения
* **respiratory organs** – дыхательные органы
* **sense organs** – органы чувств

**odour** – запах

**ovary** – (*анат.*) яичник

**parasite –** паразит

**pectoral girdle** – кости грудного плавника, пояс грудных плавников

**pelvic girdle** – кости брюшного плавника, пояс брюшных плавников

**pest** – вредитель

**pharynx** – глотка, зев

**poutch** – мешочек, полость

**predator** – хищник

**prey** – жертва, добыча

**propel** – (*v.*) двигать вперёд, приводить в движение

**protective resemblance** – защитное сходство

**protein** – протеин

**ray** – луч, радиалия

* **soft rays** – мягкие радиалии

**relay** – (*v.*) передавать

**rib** – ребро

**roe** – икра

**scale** – чешуя

* **ctenoid scale** – ктеноидная чешуя
* **cycloid scale** – циклоидная чешуя
* **ganoid scale** – ганоидная чешуя
* **placoid scale** – плакоидная чешуя

**sense** – (*v.*) ощущать

**shield** – (*v.*) защищать

**silt** – ил, осадок, наносы

**skeleton** – скелет

**skull** – череп

**slimy** – илистый, скользкий

**smell** – обоняние

**snout** – рыло, морда, нос

**sound vibrations** – звуковые колебания

**spawn** – (*n.*) икра, (*v.*)метать икру

**species** – (*биол.*) вид; разновидность, род, порода

**spinal cord** – спинной мозг

**spine I** – (*анат.*) спинной хребет, позвоночный столб

**spine** **II**– шип, колючка, игла

**steer** – (*v.*) управлять, держать курс, слушаться управления

**stiff**  – окостеневший, негибкий

**stomach** – желудок

**streamlined body** – обтекаемое тело

**stun** – (*v.*) оглушать

**swim bladder** – плавательный пузырь

**tail** – хвост

**taste** – вкус

**taste bud** – вкусовая почка

**teleosts** – костистая рыба

**testis,** *pl.***testes** – (*анат.*) яичко

**tissue** – (*анат.*) ткань

* **connective tissue** – соединительная ткань
* **soft nerve tissue** – мягкая нервная ткань

**tongue** – язык

**touch** – осязание

**trunk** – туловище

**vein** – вена, кровеносный сосуд

**ventricle** – желудочек (сердца, мозга)

**vertebrate**, *pl.* **vertebrates** – позвоночное, позвоночные

**vertenrae**, *pl.* **vertebra** – позвонок, позвонки

**weed** – водоросль

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