**Chapter 3: Our Nervous System**

**Learning Outcomes**

At the end of this lesson, learners will be able to:

* **describe** the structure and functions of the nervous system.
* **label** the parts of the brain.
* **explain** reflex action with examples.
* **list** the functions of the spinal cord.
* **take care** of the sense organs.

**Recap Time**

Look at the picture of an organ and tick (✓) the correct option.

1. This is a  
   ☐ brain.  
   ☐ stomach.
2. It is located in the  
   ☐ chest.  
   ☐ head.
3. It helps us  
   ☐ remember things.  
   ☐ grow.
4. It is protected by the  
   ☐ bones of the head.  
   ☐ muscles of the head.

**Let’s start**

The Braille script was developed by Louis Braille. Refer to the Internet and read more about him.

Four letters of the Braille script are given below. Find out what is written here in the Braille script. The big dots indicate the raised dots. Write the letters in the blanks.

**c a t** | **b a t**

Close your eyes and feel some of the things around you. Are you able to recognise them?  
How do you recognise things with your eyes closed? You remember things that you have seen before. You remember how they look and feel. Similarly, you recognise sounds you have heard before.

You know the taste of foods that you have eaten earlier. How do you remember things? It is the nervous system of your body that helps you remember what you hear, feel, see, smell, taste and learn.

**The human nervous system**

The human nervous system is made up of the brain, spinal cord and a vast network of nerves. The nervous system controls the heartbeat, breathing, digestion of food, memory, speech and every movement of the body. We are able to write, read, think and remember because of our nervous system. The nervous system controls every function of the body.

**The brain**

The brain is a soft and delicate organ, which is why it is protected within the skull. The skull is made up of several strong and hard bones.

The space between the brain and the skull bones is filled with a fluid. The fluid in the skull that surrounds the brain protects it from jerks and shocks. The brain has three parts — cerebrum, cerebellum and medulla oblongata.

**Cerebrum**

The cerebrum is the largest and the uppermost part of the brain. It helps us to **think**, **remember** and **learn**. It also controls the functions of the eyes, ears, nose and tongue.

**Cerebellum**

The cerebellum controls **movements** and maintains the **balance** of the body. It enables a person to stand, walk, run, swim, jump and sit.

**Medulla oblongata**

The medulla oblongata is the lowermost part of the brain. It regulates functions such as **heartbeat**, **circulation of blood** and **breathing**.

**Spinal cord**

The spinal cord links the brain to the other parts of the body. It begins in the medulla oblongata of the brain and extends all along the back. It is soft and delicate, like the brain. The spinal cord is protected inside the bones of the vertebral column. It is also surrounded by a fluid which protects it from jerks.

**Nerves**

Nerves are thread-like branched structures. They are present in the entire body. Nerves are connected either to the brain or to the spinal cord. Nerves transfer messages. Nerves are of different types.

**Sensory nerves**

Sensory nerves carry information—(impulses) received from various parts of the body, such as sense organs, muscles and internal organs—towards the brain or the spinal cord.

**Motor nerves**

Motor nerves carry messages from the brain or the spinal cord to body parts such as sense organs, muscles and glands.

**How does the nervous system work?**

The brain and the spinal cord receive information through the nerves. Information comes from every part of the body and also from our surroundings. Whenever the brain or the spinal cord receives information, it produces a suitable response (message). The responses from the brain enable us to see, hear, smell, taste, feel, think and remember.

**Voluntary and involuntary actions**

Actions such as walking, standing, reading and singing are controlled by an individual with the help of the nervous system. Such actions are called **voluntary actions**. You perform a voluntary action when you wish to do so.

Functions such as the beating of the heart, breathing, digestion of food and formation of urine are **involuntary actions**. An individual does not have any control over the involuntary functions of the body. They are directly controlled by the nervous system.

**Reflex action**

At times, the body needs to respond quickly to avoid injury. At such times, the body responds through a **reflex action**. A quick response to a stimulus is called a reflex action.

**Example:**  
When your finger is pricked by a pin, sensory nerves carry the impulse to the spinal cord. The spinal cord then quickly sends back a message through the motor nerves to move the arm muscles. The hand moves away quickly through reflex action.  
Stepping on a thorn works similarly — the foot moves away from the thorn quickly due to the reflex message from the spinal cord.

Some reflex actions directly involve the brain. The blinking of eyes when something moves close to the eyes is a reflex action involving the brain.

**How do sense organs work?**

The eyes, ears, nose, tongue and skin are the sense organs.

* **Eyes**: Each eye has a lens. When we look at an object, light passes through the lens and forms an image inside the eyes. This image is converted into an impulse. Nerves in the eyes carry the impulse to the brain. The brain processes the impulse and helps us recognise the object. This is how we see things.
* **Ears**: Inside the ear, there is a thin membrane called the eardrum. Sound enters the ear and vibrates the eardrum. The nerves present in the ear convert these vibrations into an impulse and carry it to the brain. The brain processes the impulse and helps us recognise the sound.
* **Nose**: The nerves present inside the nose pick up the smell, convert it into an impulse and carry it to the brain. The brain recognises the impulse and helps us identify the smell.
* **Tongue**: The tongue has numerous taste buds. When we place food in the mouth, the taste buds sense the taste. The nerves attached to the taste buds carry it as an impulse to the brain. The brain recognises the impulse and helps us know the taste of the food.
* **Skin**: We often feel things with the tip of our fingers. The skin is richly supplied with nerves. It helps us to sense pain, temperature (hot and cold) and feel things.

**Care of sense organs**

**Eyes**

* If something falls into your eye, do not rub your eye. Quickly wash your eyes with tap water.
* When you use a computer or watch television, ensure that the screen and your eyes are at the same level.
* Vitamin A keeps the eyes healthy. Spinach, drumstick leaves, carrots, sweet potatoes, pumpkins, papayas, ripe mangoes, capsicums, fish and eggs are rich in vitamin A.

**Ears**

* Wipe your ears with a clean cotton cloth after a bath.
* Do not use sharp objects such as hair pins or matchsticks to clean your ears.
* Stay away from loud sounds, loud music and firecrackers that make loud noises.

**Nose**

* Use a clean handkerchief to clean your nose.

**Tongue**

* Use a tongue cleaner to clean your tongue in the morning and at night.

**Skin**

* Wipe your body with a clean towel after a bath.
* Drink at least six glasses of water every day.
* Vegetables, fruits, milk, curd, cucumbers, tomatoes, beetroot, pulses, fish, eggs and morning sunlight are good for your skin.

**Being Safe**

The human body is amazing. We must take every precaution to keep it safe from harm, danger or injury.  
[Comic strip about personal body safety rules, speaking up, and protecting oneself.]

**Keywords**

* **Brain**: the soft and delicate organ protected within the skull
* **Eardrum**: the thin membrane inside the ear
* **Impulse**: the signal or information transmitted along a nerve
* **Reflex action**: an involuntary and quick response to a stimulus by the nervous system

**Mind Map**

**OUR NERVOUS SYSTEM**

* **Brain**: Cerebrum (Think, Remember, Learn), Cerebellum (Controls movements, Maintains balance), Medulla Oblongata (Heartbeat, Blood circulation, Breathing)
* **Spinal cord**: Links brain to body
* **Nerves**: Sensory and Motor, connected to sense organs (Eyes, Ears, Nose, Tongue, Skin)
* **Actions**: Reflex, Voluntary, Involuntary

**Exercises**

1. ✅ **Tick (✓) the correct options**
   1. The nervous system is made up of the brain, spinal cord and nerves.
   2. The spinal cord is protected inside the vertebral column.
   3. Motor nerves carry messages from the brain or spinal cord to various parts of the body.
   4. A quick response to a stimulus is called a reflex action.
   5. The lowermost part of the brain is the medulla oblongata.
2. **Fill in the blanks**
3. The brain is protected by the \_\_\_\_\_.
4. The \_\_\_\_\_ of the brain regulates the heartbeat and breathing.
5. The \_\_\_\_\_ of the brain controls movement and maintains the balance of the body.
6. \_\_\_\_\_ links the brain to the other parts of the body.
7. The space between the brain and the skull bones is filled with a \_\_\_\_\_.
8. **Copy the given flow chart in your notebook. Write the proper word in each of the boxes and complete the flow chart by adding short sentences in each box.**

Nervous system comprises:

* Brain
* Spinal cord
* Nerves

1. **Answer the following questions in one sentence**
2. Which part of the brain helps us to remember and learn?
3. Explain the meaning of voluntary actions.
4. What are involuntary actions?
5. Name the five sense organs.
6. What is the thin membrane present inside the ear called?

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**V. Answer the following questions in three to four sentences.**

1. What does the nervous system control?
2. Differentiate between sensory and motor nerves.
3. Explain how the human eyes see things.
4. Explain how we hear sound.
5. How do we know the taste of the food we eat?

**VI. Write 4–5 sentences on the following topics.**

1. reflex action
2. our sense organs
3. the human brain

**VII. Label the three main parts of the human brain and write only the words to highlight the functions of each of these parts.**

**Think and answer**

**HIGHER ORDER THINKING SKILLS**

**Read the situations given below and answer the questions.**

1. Chirag meets with a road accident. He injures his head as he was not wearing a helmet while riding a motorcycle. After the accident, he was not able to walk because he could not maintain his body balance. Which part of the brain could have been injured?
2. A spider climbed onto Anu’s hand. She quickly shook her hand and got rid of it. What kind of action helped Anu get rid of the spider?

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**Virtual tour**

Scan the QR code and watch a video to understand the importance of the nervous system.

**Self-assessment**

**Tick (✓) the correct column.**

| **I can...** | **Yes** | **No** | **Need help** |
| --- | --- | --- | --- |
| 1. list the organs of the human nervous system. |  |  |  |
| 2. explain the functions of the different organs of the human nervous system. |  |  |  |
| 3. differentiate between sensory and motor nerves. |  |  |  |
| 4. explain how the nervous system works. |  |  |  |
| 5. explain what reflex action is. |  |  |  |
| 6. talk about the functions of different sense organs and how we can take care of them. |  |  |  |
| 7. follow instructions to do an activity. |  |  |  |
| 8. answer contextual questions correctly. |  |  |  |