

SUBJECT :Science (Biology) LESSON PLAN
TOPIC : CONTROL AND COORDINATION

Pre-content / Content / Post-content	Learning outcome / objectives	
	General	Specific
PRE-CONTENT: Life Processes CONTENT: 1.Response, stimulus and sensory receptors. 2.Nerve cell-structure and function. 3.Transmission of impulses through synapse 4.Reflex action 5.Human brain - Spinal cord - Peripheral nervous system a) spinal nerve b) cranial nerve 6.Chemical co-ordination - Endocrine Glands-its location, - - Hormones secreted and function POST-CONTENT: Students will know the effect of sympathetic and parasympathetic autonomic nervous system on humans	Students will be able to- 1.identify and describe the parts, their functions and mechanism involved in control and coordination of human body. 2.investigate the importance of co-ordination of different endocrine glands and their secretion in performing various functions related to growth, metabolism and movements. 3 infer that transmission of impulses, ability to think, reflex actions are all similar in males and females. 4.establish the relation between noise pollution and problems like headache, hypertension	Students will be able to- 1.develop the meaning of stimulus and its corresponding response and sensory receptors. 2.identify nerve cell and its functions 3.explain the mechanism of transmitting nerve impulses from one part of the body to another 4.investigate and list impact of stimulus that creates reflex action and construct a reflex arc in response to a stimulus. 5.tabulate the structure and function of each part of human brain -draw a labeled diagram of human brain 6.interpret the need of chemical co-ordination -locate the position of endocrine glands in human body -list the functions of hormones as means of information transmission in human body.

HOME WORK / ASSIGNMENTS-

NCERT Textbook questions ,Extra questions given in the chapter

Diagrams of brain and reflex arc

AND PROGRESS

MONTH: JULY/AUGUST
CLASS : X

Teacher's activity	Students' activity	Teacher's observations and remedial action taken
Teacher will: - help recall activities when students gave a slow/ fast response - ask students to classify these & state the stimulus in each case & the structures/ cells receiving the stimulus - ask the students how the message (impulse) is generated & transmitted; which organs are involved, what is the path taken & the effectors that show the response - explain neuromuscular junction and structure of neuron - ask students to recall the times when they responded spontaneously & immediately - explain reflex action to them with examples - tell students enact knee jerk reflex - explain the parts of human brain with the help of diagram. - explain plant hormones and their functions from textbook. Annexure 7 (A) - make the students perform the activity on animal hormones. Annexure 7 (B) - arrange and set up experiment to show phototropism - ask students to name the hormone responsible for phototropism & for twining of tendril around a support	Students will: - recall-thinking about an answer/ hitting the ball during a game/ jumping upon seeing a rat/ blinking. - classify the above in to slow/ fast responses and whether involving brain/ spinal cord - give path of impulse- Stimulus-Receptor → Afferent Neuron → Brain/Spinal Cord → Efferent Neuron → Effector-Response - draw the diagrams of neuron & neuro-muscular junction - define reflex action & reflex arc - draw the diagram of reflex arc - represent reflex action in the form of a flow chart. - volunteer to enact & further give more examples - state few functions of the different parts of the brain in the class - note down the points and answer the questions based on the topic. Annexure 7(a) - perform the activity, note their observations and answer the questions. Annexure 7(b) - perform the activity and learn the concept of tropic movements in plants. - explain the diffusion of auxin towards shady side.	Teacher will write the observations after completion of the topic/s

Teaching aids: Smart board, stylus, work-sheets, chart of a neuron and human brain, model of a brain showing its hemispheres.

Methodology/Innovative methods-Activity based collaborative learning, Demonstration method, question-answer and discussion method.

Interdisciplinary links-Art-(drawing skill developed), English-(Power of expression will be improved by discussion.), Psychology

HOD

Coordinator

Vice-Principal

Principal

Annexure 7(A),(a)

Hormones in Animals

Subject	Science
Class	X
Chapter/Unit	Control and Co-ordination
Topic	Chemical Coordination
Time	1 hour 15 minutes
Nature of Activity	Group

What will I learn (Learning Outcome)?

Students will relate hormones with their target organs and functions

Skills: Applying, Analyzing

What I have to do? To develop the concept of endocrine system through collaborative approach.

What do I require? 8 Handouts each for 5 topics, Stop watch, 8 Talking Sticks, Plastic/Glass Bowl,
5 small pieces of paper / slips of paper.

What do I need to know? Hormones are our body's chemical messengers. They travel in our bloodstream to tissues or organs. They work slowly, over time, and affect many different processes, including growth, development and metabolism.

Teacher's Activity

Teacher will

- explain the concept of chemical coordination and hormones
- brief the activity.
- divide the students into 8 groups with five students in each group (Home group)
- write five topics in five slips and keep them in a bowl.
- rotate this bowl in all the groups and ask the students to pick a paper slip, and thus assign one topic to each member of each group.
- manage time during the activity
- reshuffle the groups into expert groups after one round of discussion

How will I proceed?

➤ Student's Activity

1. Students will arrange themselves into 8 groups (Home groups) of 5 students each-

Group A- A1, A2, A3, A4, A5

Group B- B1, B2, B3, B4, B5

Group C- C1, C2, C3, C4, C5

Group D- D1, D2, D3, D4, D5

Group E- E1, E2, E3, E4, E5

Group F- F1, F2, F3, F4, F5

Group G- G1, G2, G3, G4, G5

Group H- H1, H2, H3, H4, H5

2. Students in each group will read about the following hormones (Silent reading)-

{Time allocated- 5 minutes}

1. Adrenaline- (for students A1, B1, C1, D1, E1, F1, G1, H1)
2. Thyroxine- - (for students A2, B2, C2, D2, E2, F2, G2, H2)
3. Growth Hormone- - (for students A3, B3, C3, D3, E3, F3, G3, H3)
4. Insulin- - (for students A4, B4, C4, D4, E4, F4, G4, H4)
5. Sex hormones--- (for students A5, B5, C5, D5, E5, F5, G5, H5)

3. These students will shuffle to form five expert groups-

Group 1- A1, B1, C1, D1, E1, F1, G1, H1

Group 2- A2, B2, C2, D2, E2, F2, G2, H2

Group 3- A3, B3, C3, D3, E3, F3, G3, H3

Group 4- A4, B4, C4, D4, E4, F4, G4, H4

Group 5- A5, B5, C5, D5, E5, F5, G5, H5

They will discuss their common topics in expert groups

{Time allocated- 10 minutes}

4. Students will reshuffle to their original home groups.-A, B,C,D,E,F, G and H.
5. Each student will explain his/her topic within the home group with a talking stick in hand. Time allocated for speech will be 2 minutes.
6. One representative from each group can then present the entire topic “Hormones in animal” in the class. (Time allocated -5 minutes for each student representative of home group)

What have I observed?

Each student will fill in the required information in the table

S. No.	Hormone	Endocrine Gland	Function
1		Adrenal gland	
2.	Thyroxine		

3.		Pituitary gland	
4.			Regulates blood sugar level
5.	Sex hormones a) Testosterone b) Estrogen		

What have I learnt?

1. ----- is secreted directly into the blood and carried to different parts of the body. The target organs or the specific tissues on which it acts include the heart. As a result, the heart beats faster, resulting in supply of more oxygen to our----- . The blood to the ----- and skin is reduced due to contraction of muscles around small arteries in these organs. This diverts the blood to our----- . The breathing rate also ----- because of the contractions of the ----- and the rib muscles.
2. ----- is necessary for the thyroid gland to make thyroxine hormone. Thyroxine regulates -----,-----and ----- metabolism in the body so as to provide the best balance for growth
3. Deficiency of growth hormone in childhood leads to-----and its hypersecretion leads to-----in children.
4. Changes associated with puberty are because of the secretion of----- in males and ----- in females.
5. Insulin is produced by -----.

What am I curious to learn?

Let us explore the role of other hormones like norepinephrine, antidiuretic hormone and glucagon, secreted by adrenal gland, pituitary gland and pancreas respectively.

Let me evaluate myself-

1. What are hormones?
2. How does our body respond when adrenaline is secreted into the blood?
3. People living in hilly regions usually suffer from goiter. Why?
4. Why are some patients of diabetes treated by giving injections of insulin?

5. Draw a diagram to show position of endocrine glands in our body and name the hormones secreted by them.

Hand out

1. Adrenaline

When a stressful situation occurs and your heart begins to race, your hands begin to sweat, and you start looking for an escape, this hormone also called epinephrine is secreted, which is a crucial part of the body's fight-or-flight response. Adrenaline is produced in the medulla in the adrenal glands as well as some of the central nervous system's neurons. Within a couple of minutes during a stressful situation, adrenaline is quickly released into the blood, sending impulses to organs to create a specific response.

What is the function of adrenaline?

Adrenaline triggers the body's fight-or-flight response. This reaction causes air passages to dilate to provide the muscles with the oxygen they need to either fight danger or flee. Adrenaline also triggers the blood vessels to contract to re-direct blood toward major muscle groups, including the heart and lungs. The body's ability to feel pain also decreases as a result of adrenaline, which is why you can continue running from or fighting danger even when injured. Adrenaline causes a noticeable increase in strength and performance, as well as heightened awareness, in stressful times. After the stress has subsided, adrenaline's effect can last for up to an hour.

All these responses together enable the animal body to be ready to deal with the situation.

2. Thyroxine

Thyroxine is the main hormone secreted into the bloodstream by the thyroid gland. Thyroid hormones play vital roles in regulating the body's metabolic rate, heart and digestive functions, muscle control, brain development and maintenance of bones. Iodine is necessary for the thyroid gland to make thyroxin hormone. Thyroxin regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth. Iodine is essential for the synthesis of thyroxin. In case iodine is deficient in our diet, there is a possibility that we might suffer from goitre. One of the symptoms in this disease is a swollen neck

3. Growth Hormone

Growth hormone is released into the bloodstream from the anterior pituitary gland. The pituitary gland also produces other hormones that have different functions from growth hormone.

Growth hormone regulates growth and development of the body.

Very rarely, increased growth hormone levels can occur in children before they reach their final height, which can lead to excessive growth of long bones, resulting in the child being abnormally tall. This is commonly known as gigantism (a very large increase in height). If there is a deficiency of this hormone in childhood, it leads to dwarfism.

4. Sex Hormones- Testosterone and Estrogen

You must have noticed many dramatic changes in your appearance as well as that of your friends as you approached 10–12 years of age. These changes associated with puberty are because of the secretion of testosterone in males and oestrogen in females.

The sex hormones play a key role in reproduction and sexual development. These are mainly produced by the gonads. The sex hormones are generally involved in:

- Reproduction and sexual development
- Puberty
- Promoting hair growth
- Regulating cholesterol levels

The levels of sex hormones keep fluctuating the entire life. These fluctuations can lead to health issues such as hair loss, bone loss, infertility, etc.

5. Insulin

Insulin is a hormone made by the pancreas that allows your body to use sugar (glucose) from carbohydrates in the food that you eat for energy or to store glucose for future use. Insulin helps keep your blood sugar level from getting too high (hyperglycemia) or too low (hypoglycemia).

The cells in your body need sugar for energy. However, sugar cannot go into most of your cells directly. After you eat food and your blood sugar level rises, cells in your pancreas (known as beta cells) are signaled to release insulin into your bloodstream. Insulin then attaches to and signals cells to absorb sugar from the bloodstream. Insulin is often described as a “key,” which unlocks the cell to allow sugar to enter the cell and be used for energy.

If you have more sugar in your body than it needs, insulin helps store the sugar in your liver and releases it when your blood sugar level is low or if you need more sugar, such as in between meals or during physical activity. Therefore, insulin helps balance out blood sugar levels and keeps them in a normal range. As blood sugar levels rise, the pancreas secretes more insulin.

People with type 1 diabetes cannot make insulin because the beta cells in their pancreas are damaged or destroyed. Therefore, these people will need insulin injections to allow their body to process glucose and avoid complications from hyperglycemia

Annexure 7 (B),(b)

To Explore the Concept of Positive Phototropism

Class-X

Duration-10 days

Nature of the Activity- Group work

Learning Outcome- The students will be able to explore that the shoots of a plant show positive phototropism.

What we have to do?

To demonstrate phototropism in plants

What do we require?

Small disposable plastic cups, seeds of gram or moong, garden soil, an empty cardboard box like a shoe box

What do we need to know?

Phototropic movement is induced by light. In general, the stem mostly grows and turns towards the source of light, while the roots away from it. The leaves also positively respond toward the source of light. A stem is, therefore, said to be positively phototropic, a root negatively phototropic.

How will we proceed?

➤ Teacher's activity

The teacher will arrange five kits. Each kit will have the following things .

Small disposable plastic cups, seeds of *gram* or *moong*, garden soil, an empty cardboard box like a shoe box. Teacher will give instructions regarding the activity.

➤ Student's activity

1. Soak some seeds of gram/moong in water for one day.
2. Pierce a few small holes at the bottom of two disposable plastic cups for drainage of excess water.
3. Fill the cups three fourth with soil.
4. Put some soaked seeds on the soil and cover them by sprinkling a little soil over them. Water the seeds.
5. Put one of these cups in a window where light can fall on it.(control)
- 5.Put the other cup in a shoe box in which a hole of 2 cm diameter has been made on one side. Cover the box with the lid.

6. Put the box in a window or a place where light can fall on the box.
7. Open the box after a week.
8. Measure the length in both the set ups
9. Cover the experimental set up again with the box.
10. Again measure the length in both the set ups, after 3 days.

What do we observe?

Observe the growing seedlings.

S.No	Time period	Length of seedlings in control set up	Length of seedlings in experimental set up
1	1 week		
2	10 days		

What have you learnt?

The shoots of the seedlings are all bent towards the hole in search of light. That is because the shoot grows towards light and exhibits phototropism.

What would I like to know ?

Auxin's Role in Phototropism

Auxin is produced in the meristems of the stem. The auxin diffuses down the shady side of a stem and not the sunny side. As a result, the cells on the shady side elongate more than the sunny side and the stem bends towards the sun.

Extended learning-

1. Bending of a root of a plant towards gravity is known as-
 - a) geotropism
 - b) phototropism
 - c) thigmotropism
 - d) photonasty
2. Roots are-
 - a) insensitive to light
 - b) display negative phototropism
 - c) both a and b
 - d) neither A nor B
3. If the tip of a seedling is (a) cut off (b) covered by a black cap-
 - a) Phototropism will occur in both (a) and (b)
 - b) Phototropism will occur neither in (a) nor in (b)
 - c) Phototropism will occur in (a), but not in (b)
 - d) Phototropism will occur in (b), but not in (a)
4. Why is the response of a plant to a stimulus not observed immediately?
5. Make the following types of light-exclusion device:
 1. **Shoot cap:** Cut a small 2" x 3" square of aluminum foil. Wrap it around the tip of a straw to create a small, closed-ended metal cap, and slide it off. This will be placed over the tip of the growing shoot to cover and prevent any light coming on to the tip.
 2. **Base sleeve:** Cut a small 1/2" x 3" square of aluminum foil. Wrap it around the middle of a straw so it creates a small open-ended 1/2" tall tube, and slide it off. This will be placed around the growing shoot so that it can grow through it.

Compare the seedlings with the caps and the sleeves to the control seedlings. Are any of them growing in certain directions?
