LESSON PLAN

National High School of Computer Science"Tudor Vianu"

Teacher: Marinescu Mirela

Subject: Biology

11th Grade

Topic: The spinal cord – structure and functions

Lesson aim: knowing the structure of the spinal cord and the way the nervous system functions based on the reflex arc.

Type of lesson: acquiring new information

Types of interaction: teacher-students, student-student, group work

Targeted aims	Objectives		
	At the end of the lesson, students will:		
A1 Using learning by discovery for highlighting the structure and the functions of the human body	O1 – be able to identify the elements of the spinal cord and of the spinal nerves, with the help of illustrations, worksheets and atlases of human anatomy		
A2 Using the correct and adequate	O2 – be able to correctly define and/or explain		
scientific terminology	the terminology used throughout the lesson		
A3 Presenting, using anatomical models, the functions of human organs and systems of organs	O3 – be able to identify the components of the reflex arc		
A 4 Using the knowledge about the	O4 – be able to explain the transmission of information within the reflex arc after watching a video/short film and studying the illustration of the structure of spinal cord and that of the spinal nerves		
influence environmental factors have on the functions of the human body in our daily lives	O5 – be able to apply the acquired knowledge for the lesson on the patellar reflex		

Materials:

Didactic materials: atlas of human anatomy, large illustrations of the structure of spinal cord, spinal nerves and the reflex arc, textbook, work and evaluation sheets, models of a cross-section of a human heart, computers and educational software

Methods: explanation, conversation, demonstration, observation, working with models **Bibliography: 1.** D.Cristescu ,C. Niculescu, R.Carmaciu – Biology textbook, 11th grade , Corint Publishing House

2. I. Rosu, A. Ardelean – Biology textbook, 11th grade, Corint Publishing House

3. T. Tiplic – Biology textbook, 11th grade, Niculescu Publishing House

4. C. Ioan – Biology in images and schematics, Studenteasca Publishing House

5. T. Tiplic – Tests for matriculation exam, Aramis Publishing House

6.W.R. Pickering – Review through diagrams, All Publishing House

No.	Aim	Targeted	Teacher activity	Students' activity
1.	Anticipatory set - Identifying the students' prior knowledge	aims	The teacher asks questions about the nervous system; based on the ss' contributions, the teacher connects prior knowledge to the new lesson by highlighting that the spinal cord is a bundle of nervous tissue that acts both as a conduit for motor information and for sensory information. The teacher then announces the title and the objectives of the lesson.	The students answer the questions.
2.	Direct instruction - Presenting the main components of the lesson - Warm-up (getting ss' interested) - Guiding students during teaching	01 02 03 04 05	 the spinal cord has 2 functions: it conducts sensory information via the white matter and it conducts motor information from the brain via the reflex arc; the teacher distributes the worksheets, the atlases, illustrations and also makes sure the correct images are visible on the computers; the teacher points the location of the spinal cord using a scale model of the human body; the teacher draws on the board the schematic representation of a cross-section through the spinal cord and spinal nerves; the teacher encourages ss to draw conclusions regarding the structure of the spinal cord and its importance for the human body. 	The students discuss the computer images and fill in the evaluation chart, after working in groups. - the ss present the structure of the spinal cord using the computer images or the illustrations, as well as the information from their worksheets; - the ss draw the structure of the spinal cord and the reflex arc; they explain the reflex arc.
3.	Consolidating knowledge		- it is done throughout the entire lesson	
4.	Feed - back	O2 O3 O4	- the ss are asked to correctly match elements learned during the lesson using exercises from the educational software	Students solve the required problems.
5.	Evaluation		 evaluation test the teacher corrects the tests and gives marks to ss who were active participants during class. 	- the ss solve the exercises in writing, using the evaluation sheets.

LESSON PLAN

WORKSHEET

- the spinal cord is located inside the v..... c..... and it is protected by the spinal meninges, a structure made up of 3 layers of tissue: dura mater (which comes into direct contact with bones/bone tissue), the arachnoid and pia mater (which come into direct contact with the nervous system); between the arachnoid and the pia mater there is a space which contains cerebrospinal fluid.

CROSS - SECTION OF THE SPINAL CORD

a. – grey matter located in the in the shape of ; it is made up of
n c b; forms structures called h
- horns – anterior with m function (contain motor/efferent neurons)
interneurons)
- lateral with reflex function (¹ / ₂ posterior with viscerally-sensitive function
¹ / ₂ anterior with v function)
b. - <u>white matter</u> located in; made up of c (a, p, l);
contains ascendent and d pathways

1. – ascendant pathways (s.....)

Conclusion: ¹/₂ anterior part of the spinal cord has a nature

¹/₂ posterior part of the spinal cord has a nature

- in the central part there is the canal where fluid can be found

Structure of spinal nerve

- the spinal nerve connects the spinal cord with r..... and e...... <u>Structure</u> * - 2 r.....1. – posterior (s......); on its pathway there is the s...... g...... (here we find neural cell which send their dendrites towards r.....) 2. – anterior (m......); on its pathway there are motor neural a......

* - t..... (mixed); comes from the combination of the 2 roots
* - b which it is directed towards e.....

REFLEX ARC REPRESENTATION

.....

- place the neurons in the schematic representation, according to the one-way direction of the transmission of nervous impulse.

STRUCTURE ON THE BOARD

SPINAL CORD – STRUCTURE AND FUNCTIONS

Structure of spinal cord

grey matter – forms horns
 anterior (motor function)
 posterior (sensory function)
 lateral (vegetative/reflex function)

- white matter – forms columns

Structure of a spinal nerve

- 2 roots ventral root (carry efferent motor axons)
 - dorsal root (carry afferent sensory axons); along its path there is a spinal ganglion
- trunk (mixed)
- branches (carrying signals toward effectors)

Schematic representation of the reflex arc

	sensory path	motor path		
stimulus → RECEPTOF	R → CNS -		EFFECTOR	→ reaction

CROSS SECTION OF SPINAL CORD AND SPINAL NERVE

(illustration)

EVALUATION SHEET

- fill in the following table with adequate conclusions **The structure of the spinal cord**

no.	Structure of	Localization	Contains the	Forms the following	Functions
	the spinal		following part	structure	
	cord		of the neuron		
1.	White		axon,	•••••	- pathways for
	matter			-anterior, p,	transmission of
				1	nervous impulses
2.		interior	•••••	horns:	
				-anterior (),	
				p),	/nerve
				1(v/reflex)	plexus

Structure of spinal nerve

no.	Spin	Function of spinal nerve		
		in human body		
1.	- 2 roots:	-t	- b	- connects
	anterior			with R
	p			and E, making
				possible the survival of
				the human body in a
				given environment.
2.				
	-anterior with	- m	-m	
	function			
	-p with			
	function			
3.	The structure			
-	antarian na at a antaina		agentaine de subiab	
	-anterior root contains	-contains a	-contains dwhich	
	-n root contains	which are	R and a	
	d	formed by the	with terminal	
	and sp. g.	combination	buttons which come	
	on the pathway, which	of the 2	in contact with	
	contains n c	r	E	
	b			

EVALUATION SHEET (SOLVED)

- fill in the following table with adequate conclusions **The structure of the spinal cord**

no.	Structure of the spinal cord	Localization	Contains the following part of the neuron	Forms the following structure	Functions
1.	White matter	exterior	axon, dendrite	columns: -anterior, posterior, lateral	- pathways for transmission of nervous impulses
2.	Grey matter	interior	neural cell bodies	horns: -anterior (motor), posterior (sensory), lateral (vegetative/reflex)	- nervous centre/nerve plexus

Structure of spinal nerve

no.	Spina	Function of spinal nerve		
				in human body
1.	- 2 roots:	-trunk	-branches	- connects human body
	anterior			with Receeptor and
	posterior			Effector, making possible
				the survival of the human
				body in a given
				environment.
2		functions		
۷.		Tunctions		
	-anterior with motor	- mixed	-mixed	
	function			
	-posterior with sensory			
	function			
3.	The structure of spinal nerve elements			
	· · ·			
	-anterior root contains	-contains	-contains	
	axons of motor neurons	axons and	dendrites which	
	-posterior root contains	dendrites	come in contact	
	dendrites	which are	with Receptors	
	and spinal ganglion on	formed by the	and axons with	
	the pathway, which	combination	terminal buttons	
	contains neural cell	of the 2 roots	which come in	
	bodies		contact with	
			Effectors	