IRSTI 14.25.09 DOI:10.52301/1684-940X-2023-1-67-74

THE EFFECTIVENESS OF THE APPLICATION OF THE «THEMATIC MAP» METHOD IN BIOLOGY LESSONS IN SECONDARY SCHOOL

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Summary

The article is devoted to the study of the application of the "Thematic map" method on the topic: The role of hormones in metabolism, growth and development of the body in the 8th grade biology lesson, as well as testing the effectiveness of this method. The lesson used additional information developed by the author in the form of a thematic map, which provides reliable knowledge that allows students to correctly complete tasks as follows: choosing the right concept, making judgments, filling in a table, a crossword puzzle. The thematic map provides information about the endocrine glands - thyroid, pituitary, pancreas, and adrenal glands, in the normal state and in the state of hyper and hypo function. The effectiveness of this lesson was determined by the results of the students' fulfillment of the criteria and assessment descriptors on this topic in two parallel classes.

Keywords: *thematic map, hormones, growth and development, myxedema, gigantism, acromegaly, insulin, pituitary gland*

Introduction. As part of the updated content of education, a modern school should form students' critical thinking skills, which includes the ability to work with sources.

In the school curriculum, the topic: "Hormones" is the most difficult topic, and it requires additional efforts on the part of schoolchildren. Therefore, they need more accessible additional information on this topic. The topic of hormones of living organisms is a very broad topic, which involves many hormones of all living organisms, and students need to know the role of hormones in the vital processes of our body - all physiological processes, such as homeostasis, metabolic control, growth, development, reproduction, provision organism adaptations are possible due to hormones and processes mediated by their action [1].

Material and methods of research. Approbation of the "thematic map" method was carried out in the secondary school No. 6 in the city of Pavlodar in the 2022-2023 academic year. Object of study: the process of teaching biology. Subject of study: the effectiveness of the application of the method: "thematic map" in a biology lesson in high school. A parallel of the 8th grade was chosen and one control class (25 students) was determined, the other - experimental (25 students), in which biology classes were conducted according to the thematic plan. To track the effectiveness of the tasks performed by students, the "thematic map" method was used as a form of knowledge presentation with a focus on improving information retrieval. Students were presented the lesson procedure, the goals and objectives of the lesson on the board, as well as the criteria for evaluating completed tasks (Table 1)

Lesson progress: The role of hormones in metabolism, growth and development of the body.

The purpose of the lesson: to study the role of hormones in metabolism, growth and development of the body.

Tasks:

1) determine the value in the human body: pituitary, thyroid, adrenal, pancreas

2) get acquainted with the diseases that occur when the functions of the endocrine glands are impaired

3) define correct concepts and judgments

(Filling out the table is controlled step by step by the teacher, joint discussion, analysis of the choice of the main one) [2]

Table-1. Evaluation criteria

Evaluation criteria	Points
Completed all five tasks correctly	25
4 tasks completed correctly	20
3 tasks completed correctly	15
2 tasks completed correctly	10
1 task completed correctly	5
All tasks are completed incorrectly or missing	0
Maximum	*25*

Filling in table 2 is controlled by the teacher step by step, mutual discussion (the table is presented with the correct answers)

Table-2. "Activity of the endocrine glands"

Gland	Hormone	Normal function	Reduced function	Increased function
			в	б
Pituitary gland	Growth hormones	Growth and development of the body	Dwarfism	Gigantism, acromegaly
Thyroid gland	Thyroxine and others	Metabolic regulation	Myxedema (mucous edema) in young children - cretinism	Basedow's disease
Pancreas	Insulin	Regulation of carbohydrate metabolism	Sugar diabetes	Weakness, drowsiness, apathy
Adrenal	Adrenaline, norepinephrine	Increase the efficiency of the body during intense physical and mental work.	Bronze disease (Addison's disease).	High blood pressure, rapid heartbeat

Additional information for students (thematic maps) for tasks 1-5:

Hyperfunction of the pituitary gland. Acromegaly.

If an increase in the secretion of growth hormone occurs in adulthood, when the growth of the body has ended, then this leads to a disease called acromegaly. Patients have general obesity, an increase in the size of the lower part of the face (the nose is enlarged, the lips are thickened, the tongue does not fit in the mouth), feet and hands. At the same time, growth remains normal, since at this age the bones have already lost their ability to grow.

The role of proper nutrition in the functioning of the thyroid gland.

Thyroid hormones, thyroxine and triiodothyronine, contain iodine in their composition, an element whose intake into the body is limited. Endemic goiter occurs due to a lack of iodine in drinking water and food. In Switzerland, the incidence of goiter and cretinism dropped sharply, when residents began to be prescribed iodine without fail, and iodized salt or bread was introduced into use [3].

Sporadic, or scattered, goiter is not associated with natural foci. It occurs as a result of having foods or drugs that block the absorption of iodine. In Tasmania, milk from cows fed on plants of the barbaria family, which contain anti-iodine substances, causes goiter in children. Some varieties of cabbage, turnips, rutabaga contain natural thyreostatic components. Mindless consumption of predominantly these foods to the detriment of others can lead to sporadic goiter. Food should be varied.

Pancreas.

Head of the Department of Topographic Anatomy and Operative Surgery Associate Professor A.A. Golubev, a great connoisseur of literature and music, always skillfully filled his lectures with impressive images. About the pancreas, he spoke with inspiration:

“Like a crouching panther, she laid her head in the bend of the duodenum, flattened her thin body on the aorta, lulling her with measured movements, and carelessly deflected her slightly curved tail into the gates of the spleen - a hidden beautiful predator that unexpectedly, in case of illness, can cause irreparable harm; and the pancreas:

Beautiful like an angel in heaven

Like a demon, insidious and evil."

Hyperfunction of the pancreas

It is worth noting that this disease is quite rare and is manifested, as a rule, by a number of symptoms. So, initially, when hyperfunction occurs, general weakness, fatigue, constant drowsiness, and apathy appear. If the appropriate treatment is not prescribed at this stage, the disease will continue to progress, and the body's condition will worsen: strong and painful convulsions appear, loss of consciousness often appears, and a sharp weight gain.

Hypofunction of the adrenal glands. Bronze disease (Addison's disease).

An excerpt from the story of I.S. Turgenev "Living relics".

The author described the disease as follows: “I approached - and was dumbfounded with surprise. Before me lay a living human being, but what was it?! The head is completely dried up, one-color, bronze - neither give nor take the icon of an old letter, the nose is narrow, like a knife blade; you can hardly see the lips - only the teeth turn white and the eyes, and thin strands of yellow hair are knocked out from under the scarf onto the forehead.

This condition, known as Addison's disease, is characterized by severe weakness, weight loss, low blood pressure, gastrointestinal disturbances, an increased need for salt, and skin pigmentation. Addison's disease, described in 1855 by T. Addison, became the first recognized endocrine disease.

Task 1. Pay attention to the screen, the table No. 1 has already completed, match

your results with the tables, correct the shortcomings making conclusions on tasks.

value in the human body:

a) pituitary - growth and development

b) thyroid gland - regulation of metabolism

c) adrenal glands - mobilization of the body in stressful situations

d) pancreas - regulation of carbohydrate metabolism

Diseases that occur when the functions of the endocrine glands are impaired:

myxedema, cretinism, acromegaly, Graves' disease, bronze disease, diabetes mellitus, dwarfism, gigantism.

(Concepts are posted on a magnetic board)

Task 2. Solution to the problem. We diagnose small people (dwarfism - hypofunction of the pituitary gland).

Task 3. At the moment, a problem has appeared in the Lilliputian circus - a shortage of artists. Little people are getting smaller and smaller. What do you think this might be related to?

(Have already learned how to treat) Indeed, problems with the work of the endocrine glands in modern medicine are now being solved. It is enough to donate blood to determine the hormonal background, if any deviations are found, the doctor will offer a treatment plan. For the treatment of hormonal diseases, it is very important to make a diagnosis on time, the earlier a deviation is detected, the higher the result of treatment. Therefore, it is very important to monitor your health, seek medical help on time, and also undergo preventive examinations. In our country, there is a program for the early detection of abnormalities in the thyroid gland in newborns. During the first days of life, even in the maternity hospital, blood is taken for analysis, if abnormalities are found, treatment begins immediately.

Solving assignments for remember.

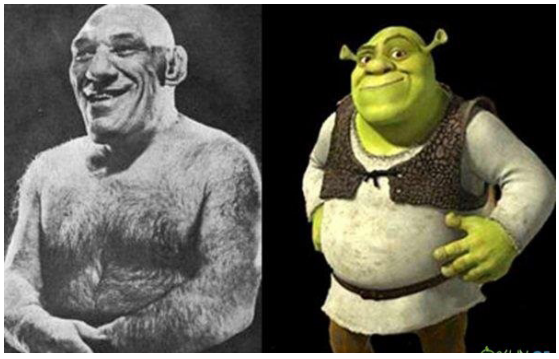
1. make a diagnosis from a photograph (dwarfism, Graves' disease, acromegaly, myxedema, gigantism)

Based on the photograph, make a diagnosis based on the photograph of a sick person.

1

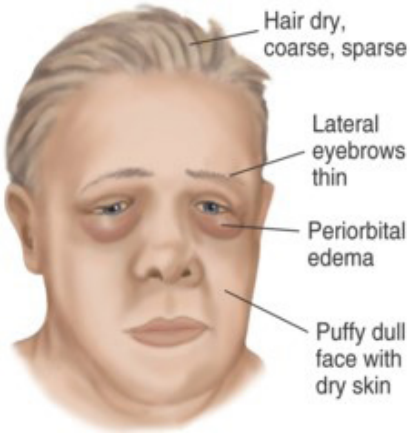
2

3



4

5



1_____
2_____
3_____
4_____
5_____

Task 4. By the name of the hormone, identify the secretion gland that secretes it:

a growth hormone -_____
insulin-_____
norepinephrine-_____
thyroxine- _____
adrenalin-_____
(Pituitary, pancreas, adrenals, thyroid, adrenals)

Task 5. Choose the correct sentences:

1. Hormones are highly active chemicals. Most hormones are produced by endocrine glands.

2. The pancreas performs only one function - the secretion of digestive juice.

3. Insulin is a hormone produced by the pancreas.

4. The pituitary gland is an endocrine gland.

5. Humoral regulation is carried out with the help of hormones.

6. Endocrine glands have excretory ducts.

7. The secret of the glands of external secretion is released into the blood.

8. The pancreas is a gland of internal secretion only.

9. The thyroid gland belongs to the glands of mixed secretion.

10. Hormones enter the blood.

Reflection.

The human body produces more than 50 different hormones. Examining the blood, you can determine the hormonal background of the body. So now, we will determine the hormonal background of the class. Imagine that in the lesson each of you developed a hormone: elation hormone, wonder hormone, fear hormone. Each of you will choose the color of the corresponding hormone and stick it on the board.

Homework:

Think over and rewrite a few facts.

1. A person can live without a stomach and gallbladder, with one lung, one kidney, and half a liver, but he will die if a small gland is removed - the pituitary gland, which weighs only 0.5 g. There are about ten endocrine glands in total, there are weight about 100 g.

2. The endocrine glands produce special substances - hormones (from the Latin word "garmao" - I excite) in an insignificant amount; for example, a person needs 0.0000003 g of vitamin B per day, and the adrenaline hormone is 1000 times less (15 g of it would be enough for all the people of the globe!) [4].

3. Hormones are very active, they greatly change the growth and development of the whole organism, regulate metabolism; lack or excess of hormones causes painful changes in the proportions of body parts (there are cases when the body weight of some people reached 500-600 kg) [5].

Research results and discussion

Table 3 shows the results of the evaluation criteria for the control (25 people) and experimental (25 people) classes.

Table 3 Indicators of the results of the evaluation criteria for the control and experimental classes.

Evaluation criteria	**Maximum points**	**Control class (25 people)**	**%**	**Total points**	**Experimental class (25 people)**	**%**	**Total points**
All tasks are completed incorrectly or missing	0	0	0	0	0	0	0
1 task completed correctly	5	4	16	20	1	4	10
2 task completed correctly	10	9	36	90	9	36	90
3 task completed correctly	15	7	28	105	7	28	105
4 task completed correctly	20	4	16	80	5	20	100
Completed all five tasks correctly	25	1	4	25	4	12	100
Total	***25 points***	***25 people***	***100***	***320***	***25 people***	***100***	***405***

The results of the assignment: the students showed the following results:

1. In both classes there is not a single student who incorrectly completed all the tasks;

2. One task - in the control class, 4 students (16%) completed, and in the experimental class, only one student (4%);

3. Two tasks - in both classes the same number (9 each) of students was completed;

4. Three tasks - in both classes the same number (7 each) of students was completed;

5. Four tasks - in the experimental class completed one student more than in the control;

6. Five tasks in the experimental class were completed by three students more than in the control class:

When summing up the scores, it turned out:

the control group had 320 points, and the experimental group - 405. Thus, the experimental class had a 26.6% higher result than the control class.

Conclusions: A study of the use of thematic maps in a biology lesson revealed that the experimental class showed a higher percentage of assimilation of theoretical material in the topic: "The role of hormones in metabolism, growth and development of the body" than in the control class.

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Орта мектептегі биология сабағында «тақырыптық карта» әдісін қолданудың тиімділігі

Аңдатпа

Мақала 8-сынып биология сабағында «Тақырыптық карта» әдісінің қолданылуын зерттеуге арналған: Гормондардың зат алмасудағы, ағзаның өсуі мен дамуындағы рөлі, сонымен қатар тиімділігін тексеру. бұл әдіс. Сабақта тақырыптық карта түрінде автор әзірлеген қосымша ақпарат пайдаланылды, бұл студенттерге тапсырмаларды дұрыс орындауға мүмкіндік беретін сенімді білім береді. Келесі тапсырмалар берілді: дұрыс ұғымды таңдау, пайымдау, кесте толтыру, сөзжұмбақ. Тақырыптық карта ішкі секреция бездері – қалқанша, гипофиз, ұйқы безі, бүйрек үсті бездері туралы, қалыпты күйде және гипер және гипофункция күйінде ақпарат береді. Бұл сабақтың тиімділігі екі параллель сабақта осы тақырып бойынша бағалау критерийлері мен дескрипторларын оқушылардың орындау нәтижесімен анықталды.

Түйінді сөздер: *тақырыптық карта, гормондар, өсу және даму, микседема, гигантизм, акромегалия, инсулин, гипофиз*

Эффективность применения метода «тематическая карта» на уроках биологии в средней школе

Аннотация

Статья посвящена исследованию применения метода «Тематическая карта» по теме: Роль гормонов в обмене веществ, росте и развитии организма на уроке биологии 8 класса, а также проверке эффективности этого метода. На уроке использовалась разработанная автором дополнительная информация в виде тематической карты, предоставляющая достоверные знания, которые позволяют школьникам правильно выполнять задания. Давались следующие задания: выбор правильного понятия, суждения, заполнение таблицы, кроссворда. В тематической карте дается информация о железах внутренней секреции - щитовидная железа, гипофиз, поджелудочная железа, и надпочечники, в нормальном состоянии и в состоянии - гипер и гипо функции. Эффективность данного урока определялась результатами выполненных учащимися критериев и дескрипторов оценивания по данной теме в двух параллельных классах.

Ключевые слова: *тематическая карта, гормоны, рост и развитие, микседема, гигантизм, акромегалия, инсулин, гипофиз.*

Материал поступил в редакцию 03.02.2023