

Chapter XVI. Natural Sciences - General Part and Standards

Article 73. Natural Sciences - General Part

Introduction

The subdivision of natural sciences there are united the following subjects: Natural Sciences, which includes the basics of biology, physics, chemistry and earth science (primary-intermediate level). Natural sciences possess the priority importance in the general education system of Georgia. Natural sciences let the pupil acquire the knowledge and skills, which will enable him/her not to retard the rapid progress of humanity, use modern science achievements, become a full member of society, and establish an active cognizant person. Such people will be able to use the knowledge as for a professional success, for the benefit of the public too. Studying natural sciences facilitates to realize the unity of the ongoing processes in the Universe, as well as to conceptualize the importance of care for the surrounding Universe and the protection of a healthy and secure lifestyle rules.

While studying natural sciences, it is important to focus on the establishment of mood-attitudes, development of research skills and the use of knowledge, which is a requirement either for modern pedagogics or the Georgian classical didactics. In accordance with Iakob Gogebashvili, the main goal of studying nature is to "open the child's compassion for nature, make him/her love to investigate and review it" ("Nature's door", I preface to the publication).

Objectives and Tasks of Teaching Natural Sciences

The goal of teaching of the subjects united in the subdivision of natural sciences is to kindle the interest in the pupil and merge the basics of natural science, develop research skills that will enable him to realize and understand the Universe, feel responsibility for himself, society and the environment.

Due to the educational goals, the Curriculum envisages the solving of specific tasks. These tasks are, as follows:

- Studying the living Universe and the ongoing vital processes within it;
- Studying the physical and chemical events within the Universe;
- Studying the Earth and the outside world;
- Studying the mutual dependence of the human and environment;
- Working out the skills of observation, description;
- Developing the skills of classification;
- Developing the skills of expression of foresight / hypothesis;
- Developing the skills of planning;
- Establishing the skills of testing experiments;
- Developing the skills of recording the data;
- Developing the skills of analysis;

- Establishing the skills of making conclusion and evaluation of it;
- Developing the skills of modeling;
- Establishing the communicative skills;

- Developing the interest towards natural science disciplines;
- Realizing the importance of natural sciences;
- Developing the positive attitude towards scientific research and novelties;
- Developing the willingness to cooperate;
- Realizing the importance of protecting the rules of health, healthy and safe lifestyle;
- Establishing the environmental care and responsibility.

Organizing the Teaching of Natural Sciences

Natural sciences are taught as a compulsory subject on all three levels of General Education.

| | Primary Level | | | | | | Base Level | | | Average Level | | |
|-------------------------------------|---------------|---|---|---|---|---|------------|---|---|---------------|----|----|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| Natural Sciences | | | | | | | | | | | | |
| Basics of Natural Sciences | | | | | | | | | | | | |
| Biology | | | | | | | | | | | | |
| Chemistry | | | | | | | | | | | | |
| Physics | | | | | | | | | | | | |
| Elective (Natural Sciences) objects | | | | | | | | | | | | |

Evaluation in Natural Sciences

The essential components of the evaluation are, as follows:

1) Homework

Types of tasks: Working on textual content, preparing answers to questions, conducting home experiment and preparing a protocol, observing the objects and processes and recording the results, finding and / or processing the information, creating a conceptual mapping, modeling, making a report, working on the project and so forth.

- The skills to be evaluated:
- Thinking;
- Researching;
- Problem solving;
- Working independently;
- Self-governing

Etc.

2) The class tasks:

Task types: Reviewing / discussing the objects and processes, conducting experiments, recording / processing data, creating model, field / field checking work, making up a conceptual map, working on the text of natural sciences and so forth.

The skills to be evaluated:

- Thinking;
- Researching;
- Problem solving;
- Social;
- communicational;
- Self-governing
- etc.

3) The summary tasks:

Task types: field / field checking work, researching work, modeling, working on the individual / group project, presentation, test and more. During the academic year, it is necessary to use different types of summary tasks.

The skills to be evaluated:

- Thinking;

- Researching;
- Problem solving;
- Social;
- communicational;
- Self-governing
- etc.

The final results of one particular study unit (e.g. topic, chapter) should be evaluated by a summary task component.

Article 74. Standards of Natural Sciences

Natural Sciences on the primary level

Natural Sciences

Introduction

On the primary level of teaching (I-VI classes) it should be established the basis for transiting the passive cognition of the environment by the pupil to the active knowledge. The pupil should have an interest in the environment and desire to study it. It is essential, that the teaching of Natural Sciences should take into consideration the very context, in which the pupil lives. The teaching of Natural Sciences must facilitate the formulating in pupil critical, creative thinking and perfect attitude towards the environment. A particular attention should be paid to the basic skills of healthy and safe lifestyle. The pupil should be able to connect the acquired knowledge and experience with the everyday life.

On the primary level, it is taught the integrated subject “**Natural Sciences**”, which combines the knowledge from the spheres of biology, physics, chemistry and earth science. The subject “Natural Sciences” includes 4 directions:

1. Scientific research - investigations;
2. The Living World (biology elements);
3. Bodies and Events (Elements of Physics and Chemistry);
4. Earth and outside world (Elements of Earth and Astronomy).

1. Direction: scientific research - investigations

Within the direction of the primary level the pupil is notified of the basics of scientific research. He/she studies research questions, assumptions, planning, conducting, observing, describing, modeling, designing, organizing, analyzing, concluding, comparing with his/her opinion, and presenting the work to the classmates for simple practical activities. From the very beginning the

pupil initially makes all the above-mentioned with the teacher's help, and at the end of the level, when the sixth level is completed, the quality of his/her work independently increases and, thus, the pupil tries to plan researching and conduct it without the active support of the teacher.

The Direction- scientific research - investigations is transparent based on the contents of the rest three directions.

2. Direction: The Living World

Within the direction the pupil gets to know the diversity of living nature, structure of organisms and peculiarities of life, basic vital needs, characteristics of the main groups of organisms, their life cycles and the forms of adapting to the environment. The pupil learns the surrounding world through easy research activities. He/she observes the living world using his/her own sense organs or simple devices; gathers and processes data; expresses the assumption and verifies the idea interesting for him/her idea through the practical activity; finds the information, establishes the conclusion based on the own observations and opinions.

3. Direction: Body and Events

Within the direction, the pupil learns about the physical and chemical developments based on his/her own observations and assumptions. With the help of the simple, obvious practical activities he/she learns new concepts. He /she gets to know the basic concepts of physics and chemistry and simple terminology based on real situations and daily life examples, that will facilitate the study of the same and new topics in the next step.

4. Direction: The Earth and Outside World

Within the direction the pupil learns the views about the earth, solar system and other cosmic bodies, develops the idea of time and space orientation. The pupil studies the ongoing cycle processes in nature, recognizes the resources necessary for the existence of life on the Earth, the ways and means of their use. For mastering the cognition of the environmental methods, it is intended the practical works including direct observation and learning tests, introduction of the simple instruments and conduction of the measuring-computational work, ground orientation, use of maps, modeling of objects and processes, etc.

The Standard of I-IV classes

A) The results to be achieved at the end of the IV class

Each outcome of the standard on the primary level is preceded by the index, which indicates the subject, the level of teaching and the number of the standard results; e.g. **natu.pr. (I) .1 .:**

"natu." - indicates the Natural Sciences;

"pr." - indicates the primary level;

"(I)" – indicates, that the standard includes I-IV classes;

"1" - indicates the resulting number.

| The Natural Sciences Standard (I-IV classes) | |
|---|--|
| The results indices | The standard result |
| 1. Direction: Scientific research - investigations | |
| natu.pr.(I).1. | 1.The pupil should be able to: Participate in practical activities and demonstrate the elementary research skills; |
| 1. Direction: The Living World | |
| natu.pr.(I).2. | The pupil should be able to: Describe the organisms (plants and animals) according to the basic signs; Group the organisms, characterize and compare the groups, discuss of their typical representatives, peculiarities of life and life cycle; Discuss of the vital needs of the organisms and their impact on environmental factors. |
| 2. Direction: Body and Events | |
| natu.pr.(I).3. | The pupil should be able to: Characterize the bodies and properties of their components / substances; Discuss of sound, light and heat sources and their distribution; Discuss the role of heat transfer in the aggregate state change; Characterize the easily observable movements and forces. |
| 3. Direction: The Earth and Outside World | |
| natu.pr.(I).4. | The pupil should be able to: Orientate in local environments; Describe water and terrestrial objects and identify them on different plans and maps; Discuss of the importance of natural resources; Explain the cyclic natural phenomena and discuss about the reasons causing them. |

B) Content

Direction: The Living World

- Organic vital signs: nutrition, growth, breathing, movement, reproduction;
- Vital needs of organisms: food, water, air, heat, light, shelter;
- Construction of plants and animals, functions of their separate parts / organs;
- The groups of organisms and their typical representatives;
- Life cycles of the major groups of organisms;
- Environmental impact on organisms.

Direction: Body and Events

- Features of substances / materials: e.g. transparency, heat conductivity, floating ability;
- Body contact union with the substance / material properties used for its preparation;
- Magnet poles; Magnet interaction with the second magnet and the body produced from various materials;
- Natural and artificial sources of light and heat and simple regulations of distribution;
- Shadow length dependence on the physical and light source interaction;
- The connection of sound source and its simplest features (loudness and tone) with the strength and length of the body fluctuation;
- The connection of speed and direction of the body changes of movement directly with the active forces of the very body (pushing, pulling) and distance (magnetic interaction, earth gravitation);
- Water aggregate conditions and their properties;
- The role of heat in the change of aggregate conditions of water;
- The reversibility of transition of water from one aggregate condition into the other and impact on the ongoing events in nature.

Direction: The Earth and Outside World

- Efficient orientation and purposeful movement;
- Recognizing the objects existing in the environment;
- The Earth's movement around its axis and the sun;
- The Moon's movement around the Earth;
- The Sun - the source of light and heat for the Earth;
- The reasons of the changes of the visible shape of the Moon;
- Water and terrestrial geographical objects;
- Soil and stones / minerals in different environments;
- Natural resources: air, water, minerals, etc.

- Water circulation in nature and its importance for living and non-living nature;
- Globe, map and place plan;
- The legend of map and plan.

The Standard of the V-VI classes

The results to be achieved at the end of the VI class

Each outcome of the standard on the primary level is preceded by the index, which indicates the subject, the level of teaching and the number of the standard results; e.g. natu.pr. (I) .1 .:

„natu." - indicates the Natural Sciences;

" pr. " - indicates the primary level;

"(I)" – indicates, that the standard includes I-IV classes;

"1" - indicates the resulting number.

| The Natural Sciences Standard (I-IV classes) | |
|---|--|
| The results indices | The standard result |
| 1. Direction: Scientific research - investigations | |
| natu.pr.(II).1. | The pupil should be able to: Participate in practical activities and demonstrate the elementary research skills; |
| 2. Direction: The Living World | |
| natu.pr.(II).2. | The pupil should be able: Discuss about the adapted significance of certain peculiarities for organisms, characterize the typical ecosystems and describe the simple power connections in them; evaluate the negative consequences caused by the rude interference of a human in nature and the ways to avoid them; recognize some of the human body and discuss about the organism as one whole; argue about the various harmful factors effecting the health. |
| 3. Direction: Body and Event | |
| natu.pr.(II).3. | The pupil should be able: Characterize the body movement according to trajectory and speed; Describe the interaction with the charged up bodies and set up a simple electrical circuit; Discuss about the different forms of energy and transition from one of its forms to another; |

| | |
|--|--|
| | Distinguish the substances and mixtures from each other according to their properties and divide the mixtures into components. |
| 4. Direction: The Earth and Outside World | |
| natu.pr.(II).4. | The pupil should be able: Describe the solar system and some astronomical events; Discuss about the light and heat distribution on the Earth; Discuss of the causes of the changes defining the Earth's structure and the Earth's relief; Argue of the reasonable-conditional connections between natural phenomena and catastrophes |

B) Content

Direction: The Living World

- Adaptations and their meaning;
- Ecosystem;
- Power connections;
- Human organism;
- Health and healthy lifestyle;
- Protection of environment and its importance.

Direction: Body and Events

- Movement and its characteristics: trajectory (linear, dotted line, curved line), passed distance, time and speed, calculation of equal movement speed;
- Electric charges and their interaction; simple electrical circuits and circuit components;
- Energy Types; Energy transfer from one form to another;
- Energy renewable and non-renewable sources and their importance to human beings;
- Clean substances and mixtures. Homogeneous and non-homogeneous mixtures;
- Methods to divide mixtures into separate components;
- The Rules for working safely in the Laboratory.

Direction: The Earth and Outside World

- Solar System: the Sun, the Earth, the Moon and Planets;
- Solar and lunar eclipse, equinox and solstice;
- Climatic zones;
- Surface shapes, structures and fossils of the Earth;
- Basic biomes spread on the Earth;
- Disasters caused by natural processes.

Chapter XXIV. Natural Sciences - Annual Programs according to the Classes

Article 88. Annual Programs of Natural Sciences

Natural Sciences

I class

Direction: Scientific research - investigations

Natu. I.1. Pupil should be able to participate in practical activities and demonstrate elementary research skills.

The result is obvious if the pupil:

- Asks simple questions about the body / phenomenon to be learned;
- Observes the object to be learned by using his/her own sense organs or simple devices;
- Participates in simple practical activities in compliance with protecting the safety rules;
- Recognizes, describes and sorts the bodies and / or events on illustration or in reality;
- Collects and reads the necessary data to answer the question (through drawings, conditional signs);
- Makes him/herself be based on the results of the personal opinions and / or observations for answering the question, which has been put;
- Uses different forms of communication (e.g. drawing, verbal, historical), when presenting his/her own views and / or research results.

Direction: The Living World

Natu. I.2. Pupil should be able to realize the importance of sense organs.

The result is obvious if the pupil:

- Name the body sense organs of a human and their functions (e.g. eye - "to see", ear - "to listen", tongue - "to feel the taste", nose - "to feel the odor", skin - "to feel warm and cold, smooth or rough surfaces ");
- Describes the familiar body qualities (e.g. color, odor, form, taste, invoice) and connects them with the different sense organs (e.g. "a ball is red - eye", "chocolate is sweet - tongue " or "snow is white and cold - eye and skin ", " lemon is yellow and sour - eye and tongue ");
- Discusses the importance of sensations and sense organs for a human (e.g. establishing the food usefulness, safe movement in the street) and animals (e.g. detecting danger in time, getting food, finding a shelter);
- Uses a variety of simple devices (magnifying glass, phonendoscope) to enhance the feeling and describes the body's qualities, which have become obvious in the process of using these devices;
- Names the personal hygiene items (e. g. comb, toothbrush, towel), discusses about the importance of protecting hygiene rules.

Content

The perception of the diversity of the environment is possible through sense organs - eye, ear, nose, tongue and skin. Everyday life organs help people to cognate and recognize the body according to their characteristics (e.g. color, odor, invoice, shape, sound). Feelings protect people from danger (e.g. in the street), enable them to percept the changes happened in the environment (e.g. weather change). It is important, that people take care of sense organs to protect the basic norms of hygiene. For animals the sense organs are particularly important to get rid of the enemy and get food.

Recommendation activities

The teacher:

- Shows the pupils a particular subject and asks to name its qualities, connect the named properties with the relevant sense organs;
- Asks a group of pupils to think of any kind of body and describe its qualities and another group- to guess the conceived body;
- Gives the pupils a task to identify the familiar subject matter with closed eyes, describe the qualities of the subject and explain how they could recognize it;

- Asks the pupils to identify the subject according to the sound it produces (e. g. as a result of a knock on it);
- Makes the pupils listen to the video material (e.g. voices of animals, various natural phenomena: rain, tears, accompanied by sea waves) and asks them to find out what produces these sounds;
- In the real environment shows the street situations by using the video material or computer simulations to the pupils. Asks them to discuss about the importance of sense organs for the perception and reaction of the warning signs;
- Offers the pupils to explore the local environment by using the different sense organs (e.g. classroom, school yard) and describe the particular bodies;
- Gives the task: Close your eyes and tell me what color is a pen? Do not touch the glass and tell me, the water in it is warm or cold? Why cannot you tell me? Helps the pupils to conclude, that the perception of any of the properties of the body can only a definite sense organ;
- Gives the pupils such kinds of tasks, on the basis of the analysis of which, they would be able to make a conclusion of necessary protection of personal hygiene (e.g. washing hands, bathing, brushing teeth, and protecting the hygienic norms in the process of computer use).

Natu.1.3. Pupil should be able to describe the living bodies according to the essential qualities.

The result is obvious if the pupil:

- Describes him/herself, classmates, and other people with visible signs of appearance (e.g. height, hair color, eye color, freckles);
- Describes and compares with each other the different parts of the body of various animals (e.g. head, limbs, tail, ears, beak, wings, trunk);
- Recognizes and names the main parts of the familiar plants (e.g. stem, leaf, root, flower, fruit);
- Sets up the model of the whole body by using the fragments of plants, animals and human body;
- Sorts into groups the living bodies as plants and animals, substantiates his/her own decision;
- Discusses about the importance of animals and plants (e.g. the use of different parts of plants for food, building material; for making the environment better; for facilitating a friendly attitude between people and animals; environmental and animal friendly; for consuming the products, the animals provide the people.
- Creates a question of comparison of plants / animals in different environments. Finds the answers: observes and compares the various plants growing in the local environment, particularly, in the classroom, the school yard (e.g. according to the shape or size of the roots, the color or thickness and length of the stems,) and / or animals (e.g. the earthworm, snail, butterfly, ladybird); Conveys the results of observation in various forms (by using oral speech, drawing, collage, and photos).

Content

The living bodies consist of different parts. The plants have roots, stems, leaves, flowers, fruits and seeds. Most of the animals have a head, body, limbs and arms. Some of them have a tail, beak, horn, mustache, and so on. Plants and animals are different from each other with various signs, such as parts of the body, with the ability to move in space. Plants, as well as animals, differ from each other according to the size, color and shape and so on of the parts of the body. People use plants and animals for their profit: as food, building material, environmental beauty and more.

Recommendation Activities

The teacher:

- Asks the pupils to identify and name the parts of the human, animal, plant body, discuss about their assignment;
- Shows the pupils the illustrations / videos of the familiar or unknown plants / animals. Asks the pupils to compare them with each other according to the signs and / or parts of the body;
- Arranges the classroom exhibition on the topic of the diversity of plants / animals (e.g. asks the pupils to present pictures, herbariums, applications, photos of animals, which walk, / fly / swim/float; plants, which have different flowers). Also asks them to make a conclusion about the diversity of living bodies;
- Asks the pupils to choose any plant or animal (e.g. their own domestic animals), tell the history of it and share the own experience with the schoolmates about the attitude towards it, make conclusions concerning the importance of animals and plants;
- Provides the pupils to the different plants / parts of them; asks the pupils to compare them with each other according to the indicated criterion (leaves - according to shape, stems-thickness, height, solidity; flower and fruit - color, shape, size, etc.) ;
- Invites a guest (veterinarian, sinologist, animal coach) to talk about the use of the safe communicational rules with animals.

Direction: Body and Events

Natu.1.4. Pupil should be able to compare the bodies according to the properties of the substance / material.

The result is obvious if the pupil:

- Describes the bodies existing around him and speaks about their consistency / material (e.g. scissors – iron; a note-book – paper; an eraser-rubber);
- Identifies and names substances / material spread throughout the day;

- Characterizes the substances / materials according to the easy observational features (e.g. transparency, flexibility, ability of floating, water resistance);
- Organizes to sort the bodies made from the same substance / material.

Content

The bodies existing around us are composed of different substances / materials (e.g. paper, metal, wood, gum, plastic, glass). Different bodies can be made from the same substance / material, but the body of the same assignment (e.g. a spoon) - from different substances / materials. Substances / materials differ from each other: transparency, flexibility, fragility, etc. The properties of the body depends not only on its shape and size, but also on the properties of its substance / material.

Recommendation activities

The teacher:

- Shows the pupils two different bodies and asks them to compare with each other; helps the pupils to use the words related to the body qualities (e. g .big, red, heavy, sparkling);
- Provides the pupils with the bodies made from the different substances / materials (e.g. paper, iron, glass, wood, modeling clay) and asks to explore their properties (e.g. smoothness, transparency, flexibility, whether they sink in water or don't; whether they have got the ability of water resistance or not);
- Provides the pupils with the combination of the body parts made from the different substances / materials and asks them to sort into the groups the body parts made from the same substances / materials;
- Provides the pupils with the bodies of the same groups (e.g. spoons, balloons) and asks them to prepare a model of the very bodies by using the modeling clay. At the end of the activity, the pupils compare the model made by themselves with the original one and with the help of the teacher connect the demonstrated differences to the appropriate properties of the material.

Direction: The Earth and Outside World

Natu. I.5. Pupil should be able to describe the local environment and orientate towards it.

The result is obvious if the pupil:

- Recognizes and names the existing objects in the learning environment (e. g. classroom, school corridor, school yard, gym, toilet, buffet, doctor's cabinet, place, where he/she should wait for the elderly people);

- Uses relevant terms (e.g. far from, right from me, above me, below) and determines the location of objects within the school area towards him/herself;
- Performs and manages simple instructions, not more than of 1-2 directions (e.g. forward and to the right) for orientation within the school area;
- On the basis of observation creates a school picture, speaks about the details, which have kindled his/her special interest;
- With the help of the teacher, together with their classmates, formulates and protects the rules of behavior in the local environment (e.g. in the class, school, yard, street, at home) (for example, protects the school cleanliness);
- Recognizes and explains the conditional signs of movement in the street, the need to protect them, speaks about the need for safe traffic rules.

Content

Each object existing on the territory of the school possesses a different assignment and location. (E.g. classroom, sports hall, toilet, buffet, library, security staircase and / or exit). For orientation it is required the knowledge of the terms and proper use of them. (E.g. far-near, to the right-to the left, up-down). The school environment requires the certain rules to be followed (e.g. cleanliness, forbearing from noise). The conditional signs are created for providing the pedestrians and cars in the street with safe movement.

Recommendation activities

The teacher:

- Takes the pupils to visit the school and its surrounding area to get well acquainted with it just in the first days, when the study starts;
- Asks the pupils to name the items, which they see in the classroom and talk about the purpose of these subjects; compare them with the existing things in their house, find the similarity between the house and the school. The teacher should try to make the school environment interesting and close to the pupils;
- Offers the pupils the games requiring space movement according to the terms of reference (e.g. two steps forward, three steps to the left for the hidden object);
- Gives the pupils the specific instructions containing the terms of reference (e.g. „ Put down the pencil to the right of the book’’);
- Asks the pupils to fulfil the tasks containing the spatial reference on a sheet of paper or in the computer (e.g. “Draw a ball under the table’’);

- Offers the tasks, in the process of fulfilment of which, the pupil should him/herself give a simple instruction with the terms of reference (for example, “Explain to George, how to find a doctor's room”; “Describe, how to get from the hall to the classroom”);
- Offers the simulative games on the topic about the traffic rules in the classroom or school yard. It is desirable, if the pupils prepare the conditional signs for the road simulative games themselves.

Natu. I.6. Pupil should be able to describe the changes connected to the period of time of day-night and the seasons of the year.

The result is obvious if the pupil:

- Names the observational changes during the day-night;
- Distinguishes day and night sections - morning, afternoon, evening, night and connects to his/her activities / work;
- Names and compares the seasons of the year with one another, discusses about their different signs, speaks of the weather characteristic of each of them;
- Names the week days; distinguishes the week days according to the features important to them (e.g. studying day – day off / rest day);
- Names the examples of the human activities, (e.g. planting plants, vintage, harvest), animals’ behavior (e.g. flying away of the birds, hibernation) and changes characteristic of plants, according to the seasons of the year (e.g. blooming, leaf-fall).
- Sorts the clothes according to the seasons.

Content

The alternation of the seasons of the year and the period of time of day-night are rhythmical phenomena. Weather, human activity, the life-style of plants and animals differ according to the seasons of the year and the period of time of day-night.

Recommendation activities

The teacher:

- Requires the pupils to describe day and night with different marks and draw a picture of the night and day;
- Asks the pupils to describe the behavior of the animals based on the results of observation or the video film during the day-night (of the domestic animals, e.g. parrots, dogs, cats) and express the opinion, why the object of their observation behaves in this or that way;

- Shows the pupils the pictures describing the seasons of the year. Asks them to find out and discuss about the different signs of the seasons and name a favorite season of the year;
- Offers the pupils to take out one of the colored sheets of paper placed in the box and connect it to one of the seasons of the year; explain why this color is related to the given season;
- Offers the pupils to play: a pupil plays a role of a season of the year, written on the card, silently, with mimics and gestures, and the classmates should guess, what season is written on the card;
- Asks a few pupils to tell their classmates about their birthdays. The teacher gives directions to them by using the questions: “What's weather is more often, when it is your birthday party? What kind of clothes do you and your friends put on? Has it been snowing / raining? Are the trees blossomed or not? Etc. After receiving these questions, the classmates should guess in what season of the year is his/her birthday.

II class

Direction: Scientific research - investigations

Natu. II.1. The pupil should be able to participate in practical activities and demonstrate elementary research - investigations skills.

The result is obvious if the pupil:

- Asks simple questions about the body / phenomenon to be learned;
- Observes the object to be learned by using his/her own sense organs or simple devices;
- Participates in simple practical activities in compliance with protecting the safety rules;
- Recognizes, describes and sorts the bodies and / or events on illustration or in reality;
- Collects and reads the necessary data to answer the question (through drawings, conditional signs);
- Makes him/herself be based on the results of the personal opinions and / or observations for answering the question, which has been put;
- Uses different forms of communication (e.g. drawing, verbal, historical), when presenting his/her own views and / or research results.

Direction: The Living World

Nature II.2. The pupil should be able to recognize the basic signs of life.

The result is obvious if the pupil:

- Lists the characteristic features of the living bodies;

- Chooses the animal, observes and gathers information about how it moves, feeds, breathes, grows, develops and breeds. Compares his/her own work to that of classmates;
- Makes examples for illustrating a human growth-development processes (e.g. becoming smaller the clothes, losing milk teeth) or presents visual material (e.g. photos taken at different ages);
- Compares the adult animals and their offsprings with each other, describes the changes in the growth-development process (e.g. size, color, cover);
- Observes and describes the process of growth of plants (e.g. the height-increasing of the sprouting wheat), by writing or photographing indicates the results of observation.

Content

Plants and animals are living bodies, or organisms. They eat, grow, breathe, move on; feeding is essential for the existence and growth of organisms. As a result of growth and development, the shape and size, color, coating and the other characteristics of the plants and animals can be changed. The movement helps animals to get food, protect themselves, in the arrangement of the place for habitation. The animals move with the help of different types of limbs (including the limbs for movement on the land, fins, wings). Plants also move, for example, the flower, which can open and close, the leaf bends to the sun. Room plants and pets need human care.

Recommendation activities

The teacher:

- Asks the pupils to list the living and non-living bodies existing in the classroom / environment; or offers the illustrations of living and non-living bodies, asks them to sort them into groups and explain why some of the bodies belong to living and non-living ones.
- Displays illustrations / videos of adult animals and their offsprings; ask the pupils to recognize, which animal's baby it is; explain how they have recognized it; discuss about the changes these animals have been undergone in the process of growth; asks them to describe how the animals care about the new generation;
- Organizes the exhibition of photographs of animals and their offsprings depicted by the pupils;
- With the pupils observes the growth and development of wheat or bean seeds and helps them to collect the data (indicating the different stages of growth and development by records, photos, sketch);
- Asks the pupils to name a specific living body and list what can do it (e.g. walk, feed, talk), then name a lifeless body (e.g. robot, ball, window) and think about what the latter can do. The teacher should help the pupils to conclude, that non-living bodies can not do any kind of movement or

action, their activity depends on any impact (e.g. a robot is moved by a person, a ball will be driven, if a person hits it, if the wind blows, a window will be open);

- Asks what is the difference between artificial and dried flowers? Helps the pupils to distinguish artificial or non-lifeless body from each other (which has never been alive) and a dried flower (which has ever been alive);
- Asks the pupils to choose any plant or animal from the local environment (domestic animal, pot plant) to study its vital manifestations through direct observation (e.g. stem growth in height, movement of leaves to the sunlight, flowers opening-closing);
- Offers the pupils to study vital manifestations / signs of the earthworm (e.g. reaction to the light or touch, etc.) through direct observation, and record the results of the observations. During the activity, the teacher should focus on the ethical issues of living organisms. It is necessary that the worms should be returned to the natural habitat after observation.

Natu. II.3. The pupil should be able to discuss about the importance of the environment for organisms.

The result is obvious if the pupil:

- Collects information and discusses the vital needs of a particular organism (food, water, soil, air, shelter);
- Creates a model of subsisting environment for a specific organism (e.g. an drawing, application or a variety of materials, for example, a composition made of modeling clay);
- In the local environments, researches the different types of habitats for organisms (e.g. Den, nest, house) describes the peculiarities of their constructions;
- Examines the necessary conditions for plant growth (e.g. puts the pot plant in different conditions – in the light /without light, waters / or does not water)and presents the results of research in different forms (e.g. verbal speech, short records, drawing, photo);
- Provides a list of food items according to his/her own ration and allocates food groups necessary for a human (e.g. vegetables, fruits, cereals, dairy products);
- Discusses about the importance of the environment for his/her health (e. g. a ventilated classroom, clean house);
- Protects the cleanliness of the environment (for example, places the household waste for purpose of necessity) and describes the importance of his/her own activity.

Content

Plants and animals live in different habitats - on land, in water, and in air. The environment gives them food, water, air, which is of vital necessities. Animals make own habitats appropriate to their needs, for example, dens, nests, lairs. Plants need water, air, sunlight and warmth for existence and growth. The person gets food from the environment, water, air, obtaining material for making household items. Air, water and food contamination are reflected on human health, plants and animals.

Recommendation activities

The teacher:

- Asks the pupils to find correspondence between the animals and their habitats by using the illustrations (e.g. swallow - nest, squirrel- hollow, mouse -hole);
- Asks the pupils to express their opinion about the consequences of restricting the vital needs of different organisms (e.g. asks the questions: „What will happen to a cow, if there is not enough grass?“ ”How it will influenc a human?“);
- Asks the pupils to discuss about that, what harm the contamination of the living environment can cause to a human.
- Shows the video film about the animals living on land, water, soil and air and asks the pupils to discuss how they satisfy their living needs in a particular environment;
- Displays video / illustrations about different types of organisms, asking questions: What materials do animals use to build a habitat? What is the purpose of constructing a shelter (e.g. The purpose is to bring up the generation, hibernate)? How does shelter corresponds to the peculiarities of the animal and its life-style?
- Conducts the outdoor lesson. Asks the pupils to find and observe the animals' habitats (e. g. birds or ants nest) in the school yard / surrounding area or in the park, study (considering safety rules) and describe their peculiarities;
- Teaches the pupils to use different materials (e. g. branches, pebbles, hay, land, clay and others) for constructing a habitat to any animal they know and submit their work to their classmates;
- Helps the pupils to observe the growth and development of plants in different conditions (without lighting / lighting, without irrigation / irrigation). Instructs the pupils to record the data and present them in the desired format;
- Facilitates the pupils to improve the school environment in the planned activities;
- Offers the pupils to create a model of a desired animal, present it and talk about that, what this animal needs for life;

- Offers the pupils to create a model of own zoo, select five animals, which they inhabit in the very zoo; draw, sculpt or cut the images of animals from different sources, place them in the corresponding cage; make a presentation of the classroom exhibition; substantiates the principle with which, it has been selected a particular environment to some of the animals;
- Invites the medical worker to talk with pupils about the importance of healthy lifestyle (hygiene rules, healthy eating, physical exercise).

Direction: Body and Events

Natu. II.4. The pupil should be able to describe magnet activity.

The result is obvious if the pupil:

- Conducts simple tests by a magnet and sorts into groups the bodies made of different substances / materials according to the interaction with the magnet;
- Conducts simple tests using two magnets and conveys the conclusion about the interaction of magnetic poles;
- Lists the examples of the use of a magnet from the daily life: magnetic board, bag lock, refrigerator fixing figures and so on;
- Uses a magnet to solve a simple problem (e. g. to remove the iron bodies separately from the pile of the metal and other materials) and / or to create a board game.

Content

A magnet has the ability to gravitate the body made of some substance / material. The magnet possesses two different poles: the same poles are rejected, while the opposite poles gravitate each other. By using the magnets can separate some bodies (mainly iron) made of substances / material from the bodies made of the other substances / materials. In everyday life a magnet has a wide use.

Recommendation activities

The teacher:

- Provides the pupils with the magnets and body compositions of various substances / materials. Asks them to get closer the magnet to the different bodies and observe, what will happen; asks them to make a relevant conclusion based on the observations;
- Provides the pupils a pair of magnets in the form of stem or horseshoe and asks them to observe how they interact. After examining the results, pupils observe the interaction of the bodies made

of magnet and iron and discuss about the similarity / difference in the result of the two experiments;

- Provides each group of the pupils with three magnets in the form of stem or horseshoe, on one of which there are marked poles, but on the two ones there is no marks; asks the pupils to identify the magnetic poles, paint with colors or press the adhesive paper with the appropriate color on them;
- Provides the groups of the pupils with the pile of the bodies of small size and different substances / materials (e.g. plastics, iron, modeling clay, wood, it is desirable of the same size and same form) and asks them to distinguish the iron bodies first without magnet support, and then with magnet use check the correctness of the choice.

Nature II.5. The pupil should be able to connect the body and the properties of its substance / material with the purpose of this body.

The result is obvious if the pupil:

- Describes and compares with each other the different bodies according to the size, shape and composition;
- Names the examples of the known for him/her substances / materials of the bodies(e.g. wood, glass, plastic) used in daily life;
- Discusses about the topic: why some of the items used by him (e.g. chair, clothes, toys) are made of several different substances / materials;
- Selects the substance / material to prepare the body for given purpose (or its model), discusses about the correspondence of the qualities of these substances / materials (e.g. smoothness, transparency, flexibility, ability of floating, and water resistance) with the body purpose;
- Receives the information and discusses about the topic: How one can use the household waste again (for example, making flower pots from plastic bottles, wastes scrap metal recycling, paper – waste paper recycling).

Content

The body shape, size and the substance used for its preparation created by a human depends on the purpose of this body. Some bodies are composed of only one type of substance / material, and some- from different substances / materials. Household waste and their proper recycling is an important problem. Modern technologies give possibilities to use some substances / materials again (paper, metals, plastics, glass), so it is desirable to collect / sort the very types of the wastes.

Recommendation activities

The teacher:

- Provides the pupils with the bodies made of the different substances and materials (e.g. paper, iron, Plexiglas, plasticine) and asks to research the properties of these substances / materials (e.g. smoothness, transparency, flexibility, ability of floating, and water resistance, water sinking, or not) and name for making what/which else subjects can be used the mentioned substances and materials;
- Provides the pupils with (or shows) the body of two or more substances / materials and asks them to find out what properties of these substances / materials cause to use them for the body;
- Offers the pupils to select any subject well-known for them and discuss with what different substances /materials are available to produce such a thing; substantiate their choice and compare it with the original one, or the earlier selected one; observe the positive and negative aspects of the change;
- Asks the pupils to find the information about some household waste processing (paper, scrap, glass and plastic vessels), also, consider how to separate and then gather these types of wastes (e.g. iron is gravitated by a magnet, floats in water).

Direction: The Earth and Outside World

Natu. II.6. The pupil should be able to describe the water and terrestrial the objects.

The result is obvious if the pupil:

- Names and describes the water and terrestrial objects in the native environment (e.g. sea, lake, river) and terrestrial (e.g. mountain, valley);
- Describes the water and terrestrial objects in nature and / or on the illustrations according to its constituent parts (e.g. mountain- mountain peak, ridge, and foot, river - shore, bottom);
- Observes, describes and compares with one another the stones obtained from the natural environment. Sorts them into groups according to the different marks (e.g. color, size, shape, smoothness);
- Examines the land samples taken from different places by a magnifying glass and touch, compares them by the different marks (e.g. color, particle size, friability, humidity content), informs the classmates the observations;
- Makes a simple experiment on the obtained samples of the ground water resistance(e.g. garden, forest, river or sea shore, meadow) in the different natural environment.

Content

The parts of the Earth are water and land. They are represented by water bodies (e.g. source, stream, river, lake, sea) and terrestrial objects (e.g. mountain, valley). Water and terrestrial objects create a natural environment. They consist of separate parts. For example, the mountain has a mountain peak, ridge and foot, and a river has a beach, river-bed. On the surface of the Earth there are different types of land and sand samples. Water in nature can be fresh or salty.

Recommendation activities

The teacher:

- Takes the pupils to the local environment and asks them to describe the geographical objects using appropriate terms (e.g. Fast river, high mountain, sandy beach, right / left bank);
- Offers the pupils to recognize a picture or photographs to identify and describe various objects (mountain, river, lake, etc.); asks the pupils to group them into water and terrestrial objects;
- Asks the pupils to draw or create models of geographical objects (e.g. To sculpt a mountain by using plasticine);
- Offers the pupils to play: the pupil chooses any object, characterizes it by three signs, and the classmates must identify and name this object.

Natu. II.7. The pupil should be able to name the natural resources used in everyday life and discuss about their importance.

The result is obvious if the pupil:

- Lists the natural resources that are used in everyday life (e.g. water, firewood, natural gas) and speaks about their importance;
- Finds the information about that, how the people get natural resources in the local environment (e.g. drinking water, timber, building stones);
- Assumes, what may happen if the natural resources are exhausted;
- Shares his/her own experience with that of the classmates, in particular, how he/she protects and / or saves natural resources;
- Discusses about that, what results can be received by pollution of the household and other types of waste in connection with the river / forest?

Content

Drinking water, forest, building stones are important natural resources for a human and other living organisms. Some natural resources (e.g. minerals, forests) are exhausted on the Earth, so it is necessary to save and care for them.

Recommendation activities

The teacher:

- Asks the pupils to tell the examples of water use in everyday life;
- Asks the pupils to discuss how resources can be saved at home and in the school (e.g. switch off the light, when it is not required);
- Asks the pupils to discuss about that, what kind of result may follow if some natural resources are exhausted. (e.g. In the result of cutting out the trees there will be left no shelter for the animals, the environment becomes lonely and the air will no longer be clean); asks to express the opinion on the ways of preventing this outcome (e.g. permanent renewal of the forest, planting of trees);
- Asks the pupils to discuss about the importance of water for plants and animals (water - as a vital requirement, the means of movement or seed spread, etc.);
- Shows the pupils a video in which it is displayed the way water passes from the reservoir to the tap; makes them paint a simple scheme;
- Takes the pupils to the polluted natural environment or shows them the video materials about the contaminated environment (photographs, video); asks them to discuss about the possible pollution results.

III class

Direction: Scientific research - investigations

Natu. III.1 The pupil should be able to participate in practical activities and demonstrate elementary research skills.

The result is obvious if the pupil:

- Asks the relevant questions and uses different methods of research to answer them;
- Conducts a simple research / practical activity in compliance with safety rules;
- Conducts measurements by using different devices (thermometer, ruler, seconds counter, scales), uses standard units;

- Uses different methods for indicating/organizing the research results (record with a simple scientific language, pictogram, table, photo, video);
- Compares and analyzes the data received from the survey. Analyzes and displays through the pictogram, table, and simple scheme;
- Uses simple terms of natural sciences, answers the questions based on his/her own observations and opinions;
- Compares his/her own results with those of the classmates;
- Submits the results and conclusions to his/her classmates in different forms of communication (e.g. verbal communication, written speech, and ICT).

Direction: The Living World

Natu. III.2 The pupil should be able to describe the flowery plants.

The result is obvious if the pupil:

- Recognizes the main organs of the flowery plant and discusses about their purpose (root - water absorption, stem –permeable to water and food, leaf - food origination, flower - origination of seeds and fruits for breeding);
- Conducts the test and reveals the function of water permeability of roots and stems; establishes the purpose of the test, explains the obtained results and makes a conclusion;
- Gets the material about the diversity of organs of flowery plants and shares it to the classmates;
- Observes and describes some external signs of flowery plants (e.g. thorns, seed extensions, root length and shape), assumes the idea, that some features of plants help him/her the in adaptation of the environment (e.g. thick stem contributes to supplying water for desert plants, long root - getting water from the deep layers of soil);
- Finds the information about the diversity of flowery plants spread in Georgia and the importance of maintaining them.

Content

Unlike other plants, flowery plants have a flower. The flowery plant bodies (organs) are: root, stem, leaf, flower, fruit and seed. Each organ performs a certain function. Flowery plants are widely spread in the form of grass, bushes and arboreal plants. They are found in a different environment (e.g. on land and in water, in hot and cold, moist and dry areas). They have different characteristics (e.g. thorns, mustaches and different means of seed breeding), which contribute to adapting to the environment. A man uses plants to feed, as well as to prepare different kinds of

medicines. Maintaining the diversity of plants is important for all living organisms, including humans.

Recommendation activities

The teacher:

- Asks the pupils to find the correspondence between the plant organs and their functions, asks the questions: How does the plant get water? How is water absorbed in the leaf? What will happen if we remove all the leaves? Where are the seeds of a flowery plants originated?
- Asks the pupils to create a plant drawing / application and mark the names of the main organs on it;
- Provides the groups with the different menus and asks to select from the list foods / dishes, which are used for plants;
- Ask the pupils to recollect and list what part of the familiar for them plants is useful to be eaten;
- Provides the pupils with the samples of plants, exploring their organs by means of magnifying glass and offers them to express their opinion concerning the purpose of some of the newly discovered features (e.g. fuzzy stem, sinewy leaf, dentate-edge leaf), make its sketch.
- Help the pupils to prepare a poster with photos of flowery plants and their short descriptions in the local environment;
- Asks the pupils to bring seeds of the different plants from home, (which are used as food in the family); gives a task to observe and according to shape, size, color etc. compare the different criteria with each other; asks them to express an assumption of which fruit of plant is derived each of them; helps them to draw a conclusion about the diversity of flowery plants;
- Offers the pupils to try planning the experiment for studying the function of water permeability of the root and stem; assume what conditions and devices are required to carry out the test; after conducting the test, asks to make a conclusion about the function of water permeability of the root and stem;
- Shows the pupils the illustrations / live material depicting external signs some of the plants (e.g. thorns, seed extensions, shape, root length, diversity of roots and stems, colors); asks them to discuss how this characteristic features contribute the plants to adapting towards the environment;
- Requires the pupils to choose the plant to obtain the information about its ability for adaptation towards the environment, the importance of it; asks them to present their works;
- Asks the pupils to select environmental factors they want to examine how these factors (light, temperature, water), plan and conduct experiments with the help of the teacher in two different

pot plants in various conditions (darkness / lightness, warmth / coldness, regularly watering / are not watering) Influence the plants and present data before the in class.

Natu.III.3 The pupil should be able to make a general description of mammals.

The result is obvious if the pupil:

- Examines / collects the information about mammal animals spread in local environment and prepares the collage reflecting their diversity;
- Observes and describes some of the external signs of animals (e.g. body shape, coating, limbs and teeth) and connects their existing and living conditions (e.g. land, water, air, sand, desert and mountain) with their peculiarities;
- Describes animals' behavior (e.g. migration, juggling, caring for offspring, winter sleep- hibernation) and explains its importance to the environment;
- Finds the information about the diversity of large mammal animals spread in the nature of Georgia and discusses the importance of maintaining them.

Content

Unlike other animals, mammals feed their offspring with milk. They are found in different living environments (land, water, air). Some external signs and different behaviors help them (body shape, coating, limbs, teeth) to adapt to the environment, (e.g. migration, juggling, caring for offspring, winter sleep- hibernation). Mammals are different from one another according to a lot of signs. Many species of mammals are spread in Georgia. To maintain the diversity of mammals, it is necessary to protect their natural habitats.

Recommendation activities

The teacher:

- Shows the pupils the illustrations of animals, asks them to identify mammals and characterize them according to their external signs;
- Offers the pupils the illustrations depicting some of the mammoth signs (such as fat supplies, cover, color, hoof size), and asks them to discuss about, that how the characteristic features are adapted to the environment;
- Shows the pupils the examples of qualitative (body color, size, cover) and behavioral adaptation of the organisms (migrations, care for the offspring, winter sleep, juggling) and ask them to discuss about their importance;

- Gives the pupils a task to sort the mammals according to various criteria (e.g. eating habits –they eat plants/ other animals, all kinds of food according to the living environment (land, water, air), body constructions (limbs, fins, hoofs, wings) ;
- Asks the pupils to choose the animal, get the information about the characteristic ability of its adaptation to the nature and the significance of it;
- Invites a guest from the local environmental organization and with his/her participation arranges a discussion about the human’s useful and harmful actions for animals.

Direction: Body and Events

Natu. III.4.4 The pupil should be able to describe the simple regulations of the heat and light spread.

The result is obvious if the pupil:

- Names and describes the natural and artificial sources of light and heat, including the sun as the most important natural source of light and heat;
- Conducts simple tests, observes light spread and discusses about the shadows formation;
- Conducts simple tests, observes heat transfer and discusses about the heat capacity of different substances / materials. Reorganizes the familiar substances / materials by this sign;
- Uses a thermometer to measure different bodies’ temperature;
- Discusses about the importance of light and heat for him/her and his/her immediate environment;
- Evaluates the risks associated with the use of light and heat sources, with the help of the teacher, works together with classmates and protects the rules of safe use of heat and light sources in everyday life.

Content

Light sources differ from each other with light power and heat sources – with the amount of heat emission. Some sources of heat, at the same time, are a source of light (e.g., sun, candle flame). The strength of the lights as well as the amount of received heat is reduced from the source. The shadow of a nontransparent body on the light path will form a shadow, the length of which depends on the interlocation of the body and the light source. Some substances / materials (e. g. metals) are well permeable for heat, while some are bad (e.g. wood-materials, plastics). Also, some substances / materials hold light (e. g. ground, water) or transparent, while others are not permeable at all. Without a source of light, it is impossible to see the bodies, which are not the light sources themselves. Without a heat source, we cannot prepare a meal / food, etc. For an eye it impossible to look at the sunlight, laser or bright shining lantern light, as it may cause damage to

the eyesight and vision, and the same is with heat, for example, the excessive approaches to some of the sources of heat may cause burning or flaming.

Recommendation activities

Teacher:

- Provides/ demonstrates the pupils with different body parts and illustrations including light and / or heat sources. Asks them to find light and heat sources and group them in the following principle: Only light sources, only heat sources, simultaneously light sources and heat sources;
- On a demonstration table, puts a clean sheet of paper, at one end of the sheet fixes a ruler in the vertical position and from one side directs the flashlight to it. Then asks one of the pupils the shadow, which is appeared on a sheet of paper, mark with a red pencil; the teacher in the same position directs the flashlight high up and asks any pupil to find a new shade and mark it with a blue pencil. After that, she in the same position raises the flashlight higher and increases the angle of light falling and asks another pupil to mark a new shade with a green pencil (all shades are of different length). The pupils compare the length of the shadows to one another and make the appropriate conclusion;
- Offers the pupils with touching substantiate how much warmer is one body in comparison with the other; then they should measure with a thermometer temperatures of the same bodies; asks them to compare with each other the data received in the result of touching or a thermometer; discuss about that, which rate is more reliable;
- Puts the wooden, plastic and iron spoons into a glass full of hot water simultaneously for a few minutes simultaneously and asks the pupils to express their supposition, the handle of which spoon is hotter. Then the pupils check the correctness of their assumption by touching the handles of the spoons and discuss about what substance / material is good the heat can be passed through it, and which one is bad;

Natu. III.5 The pupil should be able to describe the origin and spread of the sound.

The result is obvious if the pupil:

- With simple tests indicates, that the body is the source of the sound;
- As a result of observations, substantiates, that the stronger the source of the sound (the vibrating body), the more loud sound it produces;
- With simple tests explores the sound spread in different environments;
- Explores how the sound is arranged in musical instruments;
- Discusses about the negative impact of noise and loud sounds on human health.

Content

The source of the sound is a vibrating body. The sound simple characteristics (loudness and tone) depends on this vibrating body composition (i.e. what it is made of), the size and the loudness of vibration. Sounds can be spread in different environments (e.g. air, metal, water), and its loudness (strength of sound) is removed from the source. On the origin of the sound and its loudness and tone (the height of the sound) the ways / reasons can be observed on the example of some musical instruments (drums, strings). Noise and loud sounds are a significant harmful factor for humans and some materials can be used to protect them.

Recommendation activities

The teacher:

- Shows the pupils that after the fixing the one end of a ruler on the edge of the table, in the result of the hand striking on the free end of the same ruler, there is produced a sound. Then gives the each pupil a ruler asks them to change: a) the strength of the vibration; b) the length of the free end of the ruler; asks to observe the loudness and tone of the produced sound and tone and make an appropriate conclusion;
- Asks the pupils to compare the loud sounds spread in the air and on the surface of the desk with each other. Then, gives each group of pupils thread and 2 plastic glasses. Asks them to make a "phone" and connect its work to the conclusion made in the result of the previous experiment. Then gives them the task, the essence of which is to make a model of the phone by using the different materials and various sizes of thread and a glass, observe the results and make a conclusion;
- Displays the pupils the boxes made of different substances / materials (e.g. paper, metal and soft cloth). Asks the pupils to assume which of them will lock the sounds (e.g. mobile phone call) well. The correctness of the pupils' supposition is checked by the experiment.

Direction: The Earth and Outside World

Natu. III.6 The pupil should be able to directly discuss about the celestial bodies.

The result is obvious if the pupil:

- Describes and compares with one another the sun, the other stars and the moon;
- Observes the shadow length change of the same body during the day and discusses about the possible causes of this change;
- Creates and uses the Earth-Solar model to explain the day-night shift;

- Observes the change of the visible surface of the moon, performs relevant drawings and discusses about the possible reasons for this change;
- Identifies the own day / week regime with pointing time (hours).

Content

The Sun and the stars are natural sources of light, the sun shines on the moon. Day-night shifting, like the changes of the length of the shadow of the body during the day, can be explained by the moving of the Earth around its axis with the help of the earth-solar model. The moon moves around the earth. Because of this we see different fragments of the part, which is shone by the sun. The change of the moon's visible shape a periodic.

Recommendation activities

The teacher:

- Asks the pupil to demonstrate the day-night shift on the earth using light source and globe;
- Several times during the day, takes the pupils to the yard; asks them to measure the length of their own shades at different times of the day; fill the data in the table, compare them with each other and make a conclusion;
- Instructs the pupils for two weeks periodically to observe the night sky and draw the form of the moon indicating the particular date; in two weeks the pupils should present their work and on the basis of their discussion, express assumption about the reasons of the shape change of the moon;
- Let a few pupils stand on the semi-circle and offers each of them to observe a round body sparkled with a flashlight and draw the result of observation. Conducts a discussion and helps the pupils to connect the analysis of the consequences to the change of the moon's visible shape during the movement around the Earth.

Natu. III.7 The pupil should be able to characterize the natural phenomena defining the weather.

The result is obvious if the pupil:

- Lists and characterizes the natural events that are familiar to him (e.g. rain, hail, rainbow, snow, wind, and thunderstorm);
- Distinguishes and describes some of the components of the weather (e.g. the number of rainfall, temperature, wind speed/ strength);
- Observes and indicates air temperature during a certain period (e.g. During one day, one week), presents the data in the form of a table and analyzes the obtained result;

- Connects natural events with the activity of human and other organisms;
- Discusses the importance of weather forecasts in human activity;
- Detects natural disasters and names some reasons of their origin (e. g. avalanches, floods, landslides - abundant rainfall);
- Describes how to behave in a thunderstorm, strong wind.

Content

The combination of some kind of natural phenomena (e. g. rain, wind, snow, hail) create weather. The weather changes by day and night and by seasons. Weather components are: rainfall, wind speed, air temperature. Weather depends on the behavior of human and other organisms. Weather forecasting has a particular importance for people of different professions (e.g. pilots, sailors, and farmer). Natural phenomena can cause disasters that do significant damage to living and non-living nature.

Recommendation activities

The teacher:

- Provides the pupils with the detailed instructions for preparation of rainfall measuring device (rain or sediment measuring device), which is placed in the yard. The pupils periodically record the data;
- Asks the pupils to measure air temperature through the thermometer at various points of the day, compare the thermometer's views with each other, analyze the results and draw the conclusion;
- Asks the pupils to keep the weather characteristics of a certain period of time (e. g. a week); compare the published prognosis and discuss the reliability of the prediction. In the case of difference, suggest that why it cannot be determined the weather a with full accuracy;
- Shows the pupils the video footage related to natural phenomena and asks them to discuss what kind of component change of weather is associated with a natural event / catastrophe;
- Asks the pupils to demonstrate why weather forecasts are especially important for people of different professions.

IV class

Direction: Scientific research - investigations

Natu. IV.1. The pupil should be able to participate in practical activities and demonstrate elementary research skills.

The result is obvious if the pupil:

- Asks the relevant questions and uses different methods of research to answer them;
- Conducts a simple research / practical activity in compliance with safety rules;
- Conducts measurements using different devices (thermometer, rulers, second-counter, scales) using standard units;
- Uses different methods for studying and organizing the research results (a simple scientific language, pictogram, table, photo, video);
- Compares and analyzes the data received from the survey. Analyzes and displays through the pictogram, table, and simple scheme;
- Uses simple terms of natural sciences, answers the questions on the basis of the own observations and opinions;
- Compares the results of the own and classmates' observations;
- Submits the obtained results and conclusions to the classmates in different forms of communication (e.g. verbal communication, written speech, and ICT).

Direction: The Living World

Natu. IV.2. The pupil should be able to characterize the individual groups of organisms.

The result is obvious if the pupil:

- Recognizes typical representatives of the individual groups of organisms according to some obvious signs;
- Distinguishes the individual organ groups (bacteria, mushrooms, worms, arthropods, fishes, amphibians, reptiles, birds, mammals, coniferous and flowery plants) (e.g. external properties of the body, skeleton) according to the reproductive characteristics;
- Compares and organizes animals according to the characteristics of the construction, habitat and reproduction; (e.g. vertebrate - invertebrate, water animals - terrestrial animals, egg laying - giving birth);
- Compares and gathers plants according to the structure (coniferous and flowery plants), ((typical leaf - conifer, flower / fruit - absence).

Content

Organisms are divided into groups: bacteria, mushrooms, plants, animals. There exist vertebrate and invertebrate animals. The invertebrate animals are for example, worms and arthropods. The vertebrate animals are - fishes, amphibians, reptiles, birds, mammals. In the group of animals the united organisms differ from each other in terms of construction, feeding, reproductive characteristics, living environment and lifestyle. Plants are found in the form of grass, bushes and arboreal plants. The most widely spread plants are flowery plants. They form a flower, which is the breeding organ. The seeds are formed in the flower. Unlike flowery plants, coniferous plants do not produce flowers and fruits. Their seeds are placed in the cone. Many representatives of mushrooms, plants and animals are spread in Georgia. Some bacteria, mushrooms or animals cause contagious diseases.

Recommendation activities

The teacher:

- Offers the pupils the illustrations / videos of individual groups of animals asking them to group these animals according to the visible signs and name the criterion of the group;
- Examines the environment for the pupils (e.g. school yards, adjacent areas, botanical garden, and zoo) and asks them to assign this or that plant or animal to the appropriate group;
- Asks the pupils to create a suitable animal / plant model and assign it to the appropriate group. Organizes the classroom exhibition;
- Provides the pupils with the samples of different animals (wool, feathers, scales, and carapace), asks them to look at them with a magnifying glass, describe and correspond them to the appropriate animal / animal group. Express the opinion to what is related the peculiarity of the construction of each of them;
- Asks the pupils to give the examples of solicitude for descendants (birds - build a nest, care for eggs, chicks feeding, and mammals – feeding offspring, training and taking care of them).

Natu. IV.3.The pupil should be able to compare life cycles of different organisms.

The result is obvious if the pupil:

- Recognizes the basic stages of animals and plants life cycle (animals - birth, growth, development, reproduction, plants -germinating, sprouting, growth-development, formation), describes the changes connected with them;
- Observes vital cycles of organisms on different stages, presents the results in the form of drawings or records;

- Creates a scheme according to the fragments of the life cycle of a specific organism; uses the ICT technologies to draw up simple schemes;
- Names the appropriate examples to illustrate that organisms constantly change in the growth-development process and undergo various vital stages;
- Finds the similarity-difference between the vital cycles of different animals (e.g. dogs, swallows, frogs, butterflies);
- Collects the information about that, how it can be reflected a human's activity on the life cycle of organisms.

Content

Organisms grow up, develop, achieve the adult age, and give birth to generation. The representatives of the new generation of people pass the same way. The combination of these processes is called a vital cycle. Organisms provide different ways of preservation, such as plants producing large quantities of seeds, mammals care for their descendants. The main stages of life cycle of animals are: birth, growth-development, reproduction, plant-seeding, germination, growth-development, formation. Some animals develop without significant transformation, while others have different structures and vital needs on different stages of life cycle. The difference between different stages of life cycle is important to reduce competition among the organisms and save them. Human intervention in natural processes can negatively affect the life cycle of organisms.

Recommendation activities

The teacher:

- Offers the pupils the illustrations reflecting the various vital stages of the body or shows the video material. Asks how to change the organisms in the growth-development process; puts the questions (e. g. what the difference does exist between growth and development of humans and butterflies?);
- Asks the pupils to create a simple drawing / diagram of the life cycle of a specific organism, or gradually sort the stages of its life cycle;
- Together with the pupils creates an artificial habitat (e.g. by using a lidded pot, soil and sand, pebbles, small plants and animals, namely, worm and various insects, aquarium with fish and algae) and observes the growth and development of organisms in it; Asks the pupils to submit the results in drawings / photos or records;
- Talk to the pupils, what importance do some of the organisms being on the stage of different life cycles have for people? (e. g. mulberry worm (silkworm), cutworm - on the stage - the formation of silk thread, some parasite on the egg stage – causes a human infection);

- Puts the question: "What is the significance of the changes in the growth and development for organisms?" Asks them to express their assumptions;
- Offers the pupils to study different stages of the life cycle of a specific body, by direct observation, to produce results in drawings or records;
- Offers pupils to choose the desired animal to find the information of the life cycle characteristics, describe the similarity-difference between the different vital stages.

Direction: Body and Events

Natu. IV.4. The pupil should be able to easily characterize the movement and the forces to be easily observed.

The result is obvious if the pupil:

- Observes and distinguishes different types of movement (e. g. sliding, spinning, swimming, jumping);
- Describes and compares the different motions with each other according to their characteristics (speed, direction);
- Provides the simple tests to reveal the effect of the force on the body movement (changing speed and / or direction);
- Distinguishes contact forces from each other (pumping, impulsion) and the active (magnetic gravitation and earth gravitation) forces on the distance.

Content

Types of the movements to be easily observed are, as follows: skiing, sliding, spinning, swimming, and jumping etc. Their characterization is possible by the speed of movement (slowly, rapidly) and direction. Changing the speed or direction of body movement is due to the force / forces of this body. Examples the forces to be easily observed include: pushing, driving, magnetic gravitation and earth gravitation. In the action of some force (pushing, pumping), interacting bodies directly touch with each other, while some of the movements force on the distance (magnet or magnets and iron bodies gravitation, earth gravitation).

Recommendation activities

The teacher:

- Shows or any pupil with his/her help does the same, the examples of different types of movement to the rest of the pupils and ask them to name these movements (e.g. skiing, sliding, spinning, swimming, and jumping) and describe their speed and changes of the directions;

- Asks the pupils to use any kind of force (e.g. By using the force of driving, skiing, sliding, spinning, swimming, and jumping the earth gravitation), make a certain body move (e.g. toy car). The pupils name the body's driving force and substantiate their opinion;
- Instructs the pupils to prepare a simple model of transport (e.g. car, train, boat), which can be driven by impulsion of spring or rubber. Asks to describe the stages of creating a model (sequence of actions, difficulties, which have been arisen and ways of solving them).

Natu. IV.5. The pupil should be able to connect the change of the aggregate condition of water to the heat transfer.

The result is obvious if the pupil:

- Recognizes and names the examples of water existing in different conditions (liquid, ice, steam) in the natural environments and / or on the illustrations;
- Describes the changes of water condition (evaporation, condensation, melting, freezing) and discusses the importance of these changes in human activity and life (e.g. evaporation in wet clothes);
- Examines what happens to water in different aggregate conditions in case of emission or reception of heat (e.g. ice turns into water when heating; water steam becomes a liquid when cooling, and water gets frozen);
- Discusses about the connection of the change of water aggregate condition with the ongoing events in the environment (rain, snow, hail, freezing water in water reservoirs).

Content

In nature, water can be in different aggregate conditions. The transition from one condition of water to the other depends on its heat-emission/absorption. In case of heat emission/absorption the water moves from solid state to liquid and from the liquid state to gaseous or absorbed condition. During the process of heat emission there progresses an opposite process: water from the gaseous condition turns into a liquid state or condensed, and in the event of further heat emission, the liquid is transferred to a solid state, or it is freezing; People use water in all three aggregate conditions. The change of water aggregate condition is reversible, resulting in precipitation, water circulation in nature.

Recommendation activities

The teacher:

- Offers the pupils to test water properties (form, occupied volume, whether visible or not) in different aggregate conditions;
- Instructs the pupils to conduct internal experiments and observe the impact of the environmental temperature on the ice cube (measure the temperature in the refrigerator and in the room where the observation is carried out);
- Offers the pupils to investigate whether the water mass changes its aggregate position (e.g. on the example of ice cubes melting);
- Provides the pupils with the appropriate resources and instruction (including safety rules) and assigns them to observe the process of water evaporation and condensation.

Direction: The Earth and Outside World

Natu. IV.6. The pupil should be able to describe important geographical objects, determine their location and interaction on the map.

The result is obvious if the pupil:

- Reads the geographical map using the legend;
- Names and defines the key coordinative elements (e.g. poles, equator, main and medium sides of the horizon);
- On the map finds water and terrestrial geographical objects (e.g. continents, oceans, islands, peninsula);
- Uses the horizon sides for describing the large geographical objects marked on the map (e.g. near the South Pole - to the East of Africa);
- Finds Georgia on the map, describes its location in relation to geographical objects (e.g. the Black Sea bordering the West);
- Describes the geographical objects according to their constituent parts and characteristics.

Content

On the Earth they distinguish the large parts of water and land - the continents and the oceans. On the map / globe the surface of the Earth is depicted in a reduced form. They distinguish the main and intermediate sides of the horizon. There are used the conditional signs while indicating the objects on the map. Every map has a legend, which explains what is indicated with the conditional signs.

Recommendation activities

The teacher:

- Asks the pupils to look at the mountain, river, and lake sculpted by molding clay from the top and try to draw the top view; discover that the environment looks different from above; compare their own drawings with the map; observe how the mountains, river and other objects look like in the environment and how they are seen on the map;
- Conceives the object and name the objects existing around it with the indication of the horizontal sides. The Pupils should guess the conceived object;
- In case of adequate resources, gives the pupils a real route; asks them to follow it by using the map and Global Positioning System (GPS) in the local environment.
- In case of existence of the adequate resources (e.g. the bugle involved in the internet) gives the pupils a task to find distance between two objects (e.g. school and house) on the virtual model of the Earth (e.g. Google Earth, Google Map, Bing Maps).

Natu. IV.7 The pupil should be able to characterize the water cycle in nature.

The result is obvious if the pupil:

- Observes the illustrations or other visuals and describe the different aggregate conditions of water in nature;
- Discusses about the importance of different aggregate conditions of water in nature;
- Connects the formation of rain and snow in nature with the change of aggregate conditions of water;
- Schematically depicts and / or creates a water cycle model in nature;
- Lists the examples for illustrating the importance of water circulation for the living world.

Content

Water is evaporated from the surface of the Earth, rising above it, creating clouds from which in the different forms of precipitation (rain, snow, and hail) returns to earth - this process is called water circulation and has a cyclic nature. Water circulation is of great importance for living and non-living nature.

Recommendation activities

The teacher:

- Instructs the pupils to draw up the individual stages of the process of water circulation and make the inscriptions using appropriate terminology;
- Offers the pupils to discuss and compare water evaporation process at different times of the year; substantiate their opinions;
- Conducts a discussion and enables the pupils to express their views about what may happen if there is no water circulation on the Earth;
- Offers the pupils to connect the formation of rain with the water evaporation and condensation processes and work out the rain model using appropriate resources (teapot or other vessel for boiling water, plate or dish lid); then with protecting the safe rules, show how the model works.

V class

Direction: Scientific research - investigations

Natu. V.1.The pupil should be able to participate in practical activities and demonstrate research skills.

The result is obvious if the pupil:

- Asks the relevant questions and uses different method of research to answer them;
- Makes ways to find answers the questions of different sources;
- Uses natural sciences to answer the questions based on their observations and opinions;
- Conducts a research activity in compliance with the safety rules;
- Makes the measurements with the help of the different devices using the standard units;
- Uses different methods for accounting and organizing the research results (record, column, diagram, photo, video);
- Analyzes the results and makes a conclusion;
- Compares the research results of his/her own with those of the classmates;
- Submits the research results and conclusions to the classmates in different forms of communication (e.g. by using verbal communication, written speech, and ICT).

Direction: The Living World

Natu. V.2.The pupil should be able to discuss about the importance of the adaptations for the organisms.

The result is obvious if the pupil:

- Observes and describes some of the external signs of plants and animals (e.g. the surface space of the leaf, flower structure, color of the seeds, stock supplies, fat storage, and cover), which help them to adapt to their environment;
- Connects the external characteristics of the organisms with the habitat environments and explains their significance in terms of environmental interaction (e.g. thick stem contributes to supplying water with desert plants, long root - absorbing of water from the deep layers of soil);
- Recognizes the parts having the same functions of the different animals (e.g. leg, wing, flippers - movement, nose, snout, trunk, insect moustache- smell, shell, feather, carapace, scale - body protection) and discusses their role In terms of adapting to the environment from the living point of view;
- Describes an animal's behavior (e.g. migrations, uniting in herds, family life, caring for offspring, social relationships in insects, winter sleep-hibernation) and explains its importance for the environment;
- Creates and uses models to demonstrate the efficacy of protective and warning color;
- Discusses about the adapting properties of the growing plants in the different varieties of the forest (e.g. light loving, shade resistant).

Content

The organisms adapt to the existence in the defined environmental conditions (e.g. light, temperature, humidity, soil, and other organisms) by means of the special characteristic features, or by means of adaptabilities. The adaptabilities promote to get food and shelter, survival and reproduction in particular life existing conditions. The adaptabilities are revealed in the peculiarities of structures, vital processes, and behavior.

Recommendation activities

The teacher:

- Makes the pupils to look through the environment (e.g. school yard, surrounding area, park, botanical garden, and zoo) and asks them to find the examples depicting the protective and warning coloring signs;
- Offers the pupils visual materials (e.g. relevant video footage); asks them to find concrete examples of adaptations to the environment; discuss about the importance of adaptabilities to the environment;
- Offers the pupils a game to reveal the importance of the protective coloring signs; (e.g. picking up the different figures on the green background at a unit of time);

- Asks the questions: What is the common between the limbs of a human, bird and mammal? A reptile's scales and bird's feathers? And what's different? It helps to conclude that the organisms having the same purpose are different from each other according to the structure, which is caused by adaptation to particular life existing conditions;
- Asks the pupils to find the information about the social insects (e.g. ant, bees); discuss about the importance of the distribution of the functions.

Natu, V.3. The pupil should be able to characterize typical ecosystems and discuss about the importance of maintaining biodiversity.

The result is obvious if the pupil:

- Recognizes typical ecosystems for Georgia (e.g. forest, meadow, mountain, sea) according to plants and animals spread in the mountains;
- Explores the importance of light for the production of food (starch) in the plant (leaf);
- Describes the way to obtain food by each ring of food chain;
- Distinguishes animals according to feeding (herbivore, carnivore, omnivore);
- Considering the multilateral relations between organisms, discusses about the importance of maintaining biodiversity for human and the environment.

Content

The ecosystem is a unified system created by organisms and their non-living components (light, temperature, humidity). In the ecosystem, organisms create food chains, in which they attach according to the type of food that is characteristic to them. In the food chain there are distinguished three main parts: manufacturers, users and depleted. Manufacturers (green plants) represent the original source of food and oxygen on the Earth. Users (animals) according to the food chain, are divided into herbivore, carnivore and omnivore. By the food between the organisms there is implemented transferring energy and substance. Some of the human activities, such as cutting of forests, improper soil irrigation, air, water and soil pollution, may have adverse effects on the natural processes and do harm to all living-beings on the Earth.

Recommendation activities

The teacher:

- Asks the pupils to create an artificial ecosystem model and observe the organisms and environment in it;

- Offers the pupils to discuss about the negative consequences of human impact on local environment and ways to avoid them;
- Asks the pupils to create a simple model of food chain on the example of the familiar natural environment (forest, desert, marine natural environment);
- Asks the pupils to plan and try to establish the importance of the leaves for the plant (e.g. learn the growing process of the younger sprouting, some of which maintain the leaves, while the others are without of them (the leaves are removed) ;
- Asks the pupils to sort the organisms by participating in the food chain (manufacturers / users / depleted) or by the type of food (herbivore, carnivore, omnivore);
- Offers the pupils to give the examples of food chains in which people are involved;
- Asks the pupils to express their assumptions about how the human activity can be reflected on natural connections;
- Instructs the pupils to choose a particular natural environment (their habitats, forests, deserts, oceans, etc.) and explore the relationships between the organisms living in it (by using the Internet, literary sources).

Direction: Body and Events

Natu. V.4. The pupil should be able to characterize the trajectory of the body movement and discuss about its speed.

The result is obvious if the pupil:

- Describes the trajectories of the body movement (linear, dotted line, and curved line), compares them with each other and shows a diagram;
- Observes his/her own movement, measures the distance and time interval in appropriate units;
- Calculates the moving body speed and characterizes it as the physical quantity indicating the speed of the movement;
- Calculates the movable body speed, passing distance or time of the movement while solving tasks related to practical situations;
- Discusses the necessity of using standard units in everyday life.

Content

The movement is the change of body location towards other bodies. The movement is characterized by trajectory ((linear, dotted line, and curved line), the passed distance, time interval and speed. Speed is a ratio of the distance to the interval of spent time on passing the very

distance. There are different units of speed (e.g. km / h, cm / sec, m / s). Use of standard units is important to record the measurement of the physical quantity results (e.g. time, distance, and speed).

Recommendation activities

The teacher:

- Show the pupils the illustrations / videos depicting the different movements; asks them to accurately reflect the trajectory of each movement and group them according to the types (linear, dotted line, and curved line);
- Divides the pupils into the groups and asks each member of the group to calculate the speed using the measuring ribbon and second counter during the walk and run; present the results in the form of a table;
- Asks several pupils to measure the length of the classroom with their own steps; compare the results with one another and discuss about the problems associated with such measurements. Then the pupils discuss about the ways to solve these problems and name the different standard units of time, distance and speed.

Natu. V.5. The pupil should be able to describe the interaction of the bodies, which are charged up and assemble a simple electrical circuit.

The result is obvious if the pupil:

- With a simple test shows, that some of the body may be charged by friction;
- Observes and describes an interaction of the charged body with other bodies;
- Recognizes and describes the components of electric circuit (source, conductors, lamp, and switch) and discusses about their purpose;
- With the simple tests shows, that for passing electric power through the circuit, the latter must be bound;
- Assesses the risks associated with the use of electricity and protect the safe use of electric devices in everyday life.

Content

The body made from some substance / material can be charged by the friction of the body created of different substance / material. The charged bodies can gravitate or push other bodies apart. The electric circuit consists of a power source and other components of the circuit: conductors, lamp,

switch, bell, engine, etc. These components have their own graphic symbols and specific purposes. In order to pass the power through the circle, the circuit must be bound. There are certain risks associated with the daily use of electricity and it is necessary to protect the relevant safety rules.

Recommendation activities

The teacher:

- Shows the pupils how the two plastic bodies, from one of which is charged by him/her in advance, interact with the small pieces of sheet of paper; then explains, that the body can be charged and shows how easily they can charge a certain body;
- Charges the plastic body by friction on sheet of paper and touches it a small ball made of aluminum foil, which is hung on the tread; then the groups the pupils independently repeat the same activity and observe how the small discharged/charged ball hung on the tread interacts with the plastic body and other bodies. The groups fill the results of the observation in the table and on the basis of discussion about the interaction of charged body with other bodies make an independent conclusion;
- Divides the pupils into groups and asks them to assemble the electric circuit given on the diagram / scheme using the conductors, power source (element), switch and light bulb. The groups of the pupils discuss about that, what makes the electric power pass/or do not pass through the circuit, the conclusion is presented by them in written form.

Direction: The Earth and Outside World

Natu. V.6. The pupil should be able to describe the solar system, some space bodies and their connection with the astronomical events, which are easily observed.

The result is obvious if the pupil:

- Uses models, describes the position and movement of the Earth and other planets in the solar system;
- Creates the models of solar and lunar eclipse and discusses about the reasons of the eclipse;
- Observes the night sky and paints the results of the observation. Uses relevant maps / atlases and finds the correspondence between his/her drawing and some star constellation;
- Discusses the importance of the telescope in the study of the celestial bodies.

Content

The Parts of the solar system are: the sun, planets with their satellites, asteroids, comets and meteors. The particular position and movement of the Earth and Moon towards the Sun gives possibility to observe the sun and moon eclipses. The sun is one of the stars. In the night sky, without using any device it is possible to see other stars, which are far from the earth in comparing with the sun. According to the positions there are distinguished star constellations. The celestial bodies were observed by people from time immemorial. The technologies used to study the celestial bodies have been developed over time.

Recommendation activities

The teacher:

- Asks the pupils (in pairs or in groups) to select the material and prepare the model of the solar system; discuss about the strong and weak sides of the model.
- Gives the pupils a task to find out how the astronauts satisfy basic vital needs (e.g. food, water, waste disposal) while living and working in space;
- Shows the pupils the video clips about the study of cosmos by the scientists connected with the important facts (e.g. the first flight in space, the first woman cosmonaut, the first descending of a human on the moon) and asks them to discuss about their importance;
- Asks the pupils to express their opinions concerning that, how they imagine to study the cosmos in the future;
- Instructs the pupils to work on the project: How people reflect their imagination in astronomical events in dramas, films, literature and painting.

Natu. V.7. The pupil should be able to characterize the structure of the Earth and the ongoing processes in the Earth crust.

The result is obvious if the pupil:

- Recognizes and names the structural parts of the Earth (core, mantle, crust);
- Explains natural phenomena (volcanic eruptions, earthquakes) with peculiarities of the Earth's structure and the ongoing processes in the Earth's crust;
- Prepares the illustrative model of the process of mountain building (e.g. of a sheet of paper, plastic or dough);
- When playing the simulative game, protects the elementary rules of a behavior during the earthquake;

- Discusses about the historical development of a particular place on the Earth by the fossil organisms (e.g. the fossil organisms of the sea discovered in the limestone of Imereti and Racha).

Content

The Earth consists of core, mantle, and crust. The crust is the outer surface of the Earth, the thinnest layer. It consists of rocks, minerals, soil. It is settled by organisms. Some of the processes in the Earth's crust cause to move the separate parts of the core towards each other, resulting in the process of mountain building, earthquakes and volcanic eruptions. In the core of the Earth, it is possible to discover a variety of organisms' fossils or their imprints that provide information about the Earth's past.

Recommendation activities

The teacher:

- Asks the pupils to prepare sample models for earthquake and volcanic eruptions;
- Offers the pupils electronic games on natural disasters, which are placed at the address www.buki.ge;
- Asks the pupils to prepare a model of fossilized remains;
- Lets the pupils know how the scientists restore the look of the extinct organisms according to the fragments of the fossils. Offers the pupils a fragment of a certain organism of the fossil or an image of the imprint and on the basis of it asks them to create a complete look of the organism with the own imagination and substantiate their own decision;
- Organizes a visit of the pupils to the museums where the paleontological material is located.

VI class

Direction: Scientific research - investigations

Natu.VI.1.The pupil should be able to participate in practical activities and demonstrate research skills.

The result is obvious if the pupil:

- Asks the relevant questions and uses different method of research to answer them;
- Makes ways to find answers to the question of different sources;
- Uses natural sciences to answer the questions based on their observations and opinions;

- Conducts a research activity in compliance with the safety rules;
- Makes the measurements by means of the different devices using the standard units;
- Uses the different methods for accounting and organizing the research results (record, column diagram, table, photo, video);
- Analyzes the results and makes a conclusion;
- Compares the results of the own observations with those of the classmates;
- Presents the results and conclusions to the classmates in the different forms of communication (e.g. verbal communication, written speech, and ICT).

Direction: The Living World

Natu.VI.2.The pupil should be able to discuss about the human body as one whole.

The result is obvious if the pupil:

- Recognizes some organs of the human body (e.g. bone, muscle, stomach, lungs, heart, blood vessel) and describes their purpose;
- Determines the mutual deployment of the organs on the body model;
- Lists the examples of the associated actions of the different organs and discusses about the importance of the associated actions of the organs;
- Sorts the different organs according to the function (e.g. stomach, intestine - food decomposing and digestion, heart and blood vessels - supplying the body with nutrients and oxygen, muscles and bones - body movement and protection).

Content

The human body consists of separate organs. The associated actions of them provides the organism as a whole system with functioning (e. g. While running, a heart and lungs work in accordance with the load of muscles).

The bones and muscles serve the movement of the body and form the support for the whole body. The purpose of stomach and intestines is to decompose and digest the obtained food. Oxygen transfusion is carried out in the blood through the lungs. Blood supplies the body with oxygen and nutrients. Blood circulation in the blood vessels is determined by heart.

Recommendation activities

The teacher:

- Asks the pupils to recognize a separate organ of the body using visuals (on the model / illustrations);
- Instructs the pupils to find the correspondence between the organs and their functions, describe the location and meaning of the organ of the body for the organism;
- Asks the pupils to compare any of the organs from everyday life with the artificial systems that are familiar to them (such as heart - engine, pump; kidney – filter; skeleton - building frame; blood vessels - irrigative system, rivers network, etc.). To justify the correctness of comparison;
- Asks the pupils to listen to their heartbeats (with the help of stethoscope) and the pulse, then count each of them for a minute and compare with each other;
- Asks the pupils to think situational examples in which more than two organs are involved;
- Asks the pupils to discuss about the role of the proper working of a certain organ of the body in maintaining their health.

Natu.VI.3.The pupil should be able to discuss about the influence of different factors on human health.

The result is obvious if the pupil:

- Names the elementary rules of defense from microorganisms causing disease (e.g. wash hands and other norms of hygiene in daily life, vaccination);
- Names the negative effects on human health (e.g. increased radiation, contaminated environment, unhealthy nutrition, noise, nicotine, drugs);
- Realizes the importance of healthy nutrition and draws up the list of necessary products to be included in his/her ration (e.g. vegetables, cereals, dairy products);
- Talks about some of the food storage rules, reads the food label and defines its usefulness;
- Reveals the elementary rules of First Aid (e.g. light wounds treatment, fixing damaged limbs, to stop bleeding).

Content

The harmful effects of heart are: unhealthy diet, nicotine and drugs, sleep insufficiency, lack of physical activity, as well as environmental pollution, disease-causing microorganisms, increased radiation, noise and so on. To protect the own life from disease-causing microorganisms, it is necessary to maintain the norms of hygiene and conduct proper vaccination. Healthy feeding

implies a balanced ration and use of good food products. In case of the traumatic injury the rules of the First Aid are: to treat wounds, to fix damaged limbs, to stop bleeding.

Recommendation activities

The teacher:

- Asks the pupils to find the information about the human pernicious habits and prepare the agitating materials against them (e.g. posters);
- Asks the pupils to draw up a balanced diet with a defined period (1 day / 1 week) and substantiate the importance of each component of it;
- Offers the pupils a simulative game, "doctor-patient" in which the "doctor" presents the elementary rules of the First Aid;
- Asks the pupils in the simulative game play a role of a person, who takes measures of preventing the contagious diseases and discuss about the importance of prevention for themselves and their peers;
- Asks the pupils to name some known diseases (e.g. influenza, mumps, measles) and their symptoms (rhinitis, cough, rash);
- Offers the pupils a simulative game during which they are responsible for preventing contagious diseases;
- Guide the pupils to discuss about the ways to prevent the body from solar burning, overheating or overcooling.

Direction: Body and Events

Natu.VI.4.The pupil should be able to discuss about the different forms of energy and their inter conversion.

The result is obvious if the pupil:

- Describes and distinguishes from each other different types of (e.g. motion, heat, electrical, food and fuel) energy;
- With the examples or simple tests shows, that energy can be transferred from one body to the other;
- With the examples or simple tests shows, that energy can be transferred from one type to another (for example, moving energy into heat energy, electric energy - in light, heat or motion);
- Distinguishes the sources of renewable and non-renewable energy from each other and discusses the importance of them for a human being.

Content

Body movement, heating, lighting, etc. are defined by the presence of different types of energy. Thus, they distinguish energies of movement, heat, electricity, food, and etc. There are natural, artificial, renewable and non-renewable sources of energy. Energy can be transformed from one type (condition) into another or transferred from one body to the other one. Energy and its sources are of particular importance for the existence of modern humans (e.g. heating, lighting, transport, water supply). Accordingly, saving of non-renewable sources of energy, their proper use and / or replacement with renewable energy sources is one of the most important problems of modernity.

Recommendation activities

The teacher:

- Asks the pupils to write down the list of items existing at home, which requires energy for functioning and name the type of energy (e.g. heat, electric);
- Shows the pupils a certain toy working with electricity, from which the elements are taken out in advance. Then asks them to think about the reason why it does not work. The pupils themselves or with the help of the teacher's remark understand, that the simplest reason can be the lack of elements. The teacher asks them to discuss about that what kind of energy source is the element and to name other items that need the same energy to work;
- Divides the class into several groups and names different forms of energy to each of them; asks the groups to give some examples of conversion of this type of energy into another type of it. At the end of the activity it is worked out a scheme with examples of each type of energy conversion;
- Displays the pupils the pictures or draws on the board the different sources of energy (e. g. sun, natural gas, wind, river, oil, firewood), asks the pupils to group them into renewable and non-renewable energy sources and substantiate their own opinions.

Natu.VI.5The pupils should be able to describe the properties of substances and discuss about their changes.

The result is obvious if the pupil:

- Names the examples of substances used in life and discusses about their properties;
- Observes and compares substances according to properties (e.g. smell, radiance, combustion, aggregate condition, etc.), presents the results in the form of a table; analyzes and separates the qualities, which define the use of these substances;

- Characterizes some of the substances known for him (e.g. oxygen, water, carbon dioxide) and discusses about the importance of them for the living organisms;
- Distinguishes the changes in the properties of the substance (e.g. change of shape, color and aggregate condition) and discusses about the causes of these changes (e.g. heating, mixing, burning, mechanical impact);
- Following the safety regulations gives the examples of the changes in the properties of the substance (e.g. change of aggregate condition, burning, color, shape, and smell) for studying or lists the examples from everyday life; on the basis of the results of analysis distinguishes the physical and chemical changes.
- Finds the relevant information on receiving or processing of various substances, discusses the effect of these processes on the environment.

Content

Substances are characterized by different properties. Some features can be seen, some - felt, and others - measured. The properties of substances define the use these substances. Changes in the properties can be carried out by physical and chemical transformations. In the process of physical transformations it may be changed the form or condition of the substance, but the substance remains the same (for example, the flat iron nail consists of iron itself, water in all the aggregate condition is water). The substance remains unchanged in the aggregate condition, i.e. this change belongs to the physical transformations. During the chemical transformations (e.g. combustion), a new substance is formed. The properties of substances and their transformations can be used for the benefit of people. However, in some cases, it can negatively affect a human's health and the environment (e.g. use of polyethylene parcels, preservatives, etc.). For protecting the environment it is significant the recycling of household and industrial waste, which is also based on the properties of the substances and the ability of transformation.

Recommendation activities

The teacher:

- Provides the pupils with the subjects of different substances/ materials (plastic cups, aluminum vessels, ceramics crucible) and asks them to assume which of them is used to heat the substance on the flame of the spirit burner? Then he/she makes an experiment for checking the assumptions expressed by the pupils;
- Provides the pupils with the samples of the different substances used in everyday life (water, vinegar, sugar powder, chalk, metal, etc.) and asks to describe their physical properties (smell, color, aggregate condition);

- On the sample of water shows the pupils the transition of the substance from one aggregate to another (evaporation and condensation, melting and evaporation, and solidifying); asks them to analyze whether the substance changes during these transformations; instructs them to compare these processes with each other from the view of the to the heat transferring - absorption;
- Shows the pupils the pictures or videos or uses appropriate situational task and conducts a discussion about the need for protection of natural resources from household waste.

NatuVI.6The pupils should be able to differentiate substances and mixtures from each other, use the methods of dividing the mixtures into the components.

The result is obvious if the pupil:

- Distinguishes substance and mixture from each other. Lists the familiar for him/her natural mixtures (e.g. air, drinking water, sea water, mineral water, any dish, etc.);
- Prepares homogeneous and non-homogenous mixtures (e.g. salt saline water solution, chalk powder and water mixture), compares them and discusses about the similarity and difference between them;
- By the instruction of the teacher allocates any of the components from the mixture using the appropriate physical method (e.g. filtering, drying up, sifting, draining);
- Chooses and uses the appropriate methods with protecting the safety rules (e.g. to extinguish, distribute, distribute, filter, and break) in order to divide the mixture into the components in the situations of everyday life;
- Lists the examples of the use of mixtures in the daily life.

Content

The substance and the mixture differ from each other. The mixture consists of two or more substances, which are mixed with each other by any ratio. There are homogeneous and non-homogeneous mixtures. There are used different methods to divide the mixture into separate components, depending on the structure of the mixture. The structure also provides a wide variety of mixtures. Mixtures are widely used in both industry and human daily activities.

Recommendation activities

The teacher:

- Provides the groups of the pupils with the different substances / materials (e.g. water, sand, salt, oil, vinegar, chalk powder, sawdust, etc.) and instructs them to prepare homogeneous and non-homogeneous mixtures;

- Provides the groups of 4 - 5 pupils with the samples of the different mixtures (e.g. chalk water, sand and fine pebbles mixture, sawdust and sand mixture, saline water, mineral water, tea powder, coffee, etc.) and instructs the pupils to reasonably sort them into homogeneous and non-homogeneous mixtures;
- Provides the pupils with the different mixtures and instructs them to select from their familiar methods of the mixture derivation into components and use one of them by protecting the safety regulations; substantiate their choice;
- Instructs the students to develop safety rules that must be followed during the separation of different mixtures of compounds;
- Instructs the pupils to work out the safety rules, which they definitely protect in the process of dividing the different mixtures into the components;
- Divides the pupils into groups and instructs each of them to divide a certain mixture into the components by protecting the safety regulations.

Direction: The Earth and Outside World

Natu.VI.7.The pupil should be able to discuss about heat and light distribution on the Earth.

The result is obvious if the pupil:

- Discusses about the alternating of the seasons on the Earth;
- Plans and conducts the test (e.g. globes and panels) for demonstration the uneven distribution of heat and light on Earth surface;
- Connects the existence of main climatic girdles on the Earth with the uneven distribution of heat and light;
- Compares the two climatic girdles according to the basic characteristics.

Content

The axis of the Earth rotation is bent down towards the plane of its movement around the sun. Because of the bending of its axis heat and light are unevenly distributed in the Northern and Southern hemispheres. This is due to the fact, that there exist seasons on the one hand, and on the other hand, when in the northern hemisphere is winter, in the southern hemisphere is summer. According to the heat distribution on the Earth, they distinguish the main climatic girdles: equatorial, tropical, mild and polar.

Recommendation activities

The teacher:

- Together with the pupils, uses a globe / ball and lamp bulb to demonstrate the uneven distribution of solar rays on the Earth;
- Asks the pupils to find the information and make a comparative analysis of cold and hot thermal girdles (possible in the Vienna diagram format);
- Asks the pupils with the help of the map to determine which countries belong to the hot and cold climatic girdles; find the information about the peculiarities of these countries (e.g. agricultural types of cultures, types of sports) and connect them with the natural conditions.

Natu.VI.8. The pupil should be able to discuss about the role of natural phenomena and human activity in the changing of the terrestrial relief.

The result is obvious if the pupil:

- The pupil explores and describes the relief of the familiar natural environment; represents a visual material (e.g. photos) concerning its diversity;
- Obtains the information and describes the examples of relief changes in the familiar environment for him;
- Expresses an assumption concerning that, what natural (e.g. raging mountain torrent, rains,) or artificial processes (e.g. agriculture activity, road providing) define the results of the changes of the surface of the Earth;
- Reviews the impotence of the changes of the surface of the Earth (e.g. erosion, abrasion) for the living world.

Content

The forms of the terrestrial relief are: mountains, ridges, valleys, plains, ravines, gorges and others. They are formed by the impact of the ongoing processes on the Earth's crust. The perpetrating processes on the relief are the erosion of rock layers by the wind and rain, rinsing out the soil by the above-ground waters or losing the river-bed by the river, flushing out the shore of the sea. The factor of the changes of the Earth relief is a human's activity, including the agricultural activity too, providing the roads and other communications. The changing of the relief structure is a constant process.

Recommendation activities

The teacher:

- Lets the pupils make an experiment to show the sand surface changing by the water flow; changes the power/pressure of water ripple;
- Lets the pupils compare the photos taken at the same places at different times and asks to find the difference between them;
- Displays the illustrations / photographs reflecting the consequences of human activities (e.g. extracting minerals, processing soil, trenching and irrigative systems and constructive works); asks to discuss about their impact on the Earth relief and their positive / negative significance for a human and environment;
- Asks the pupils to express their assumptions about the reasons (e. g. earthquakes, landslides, hurricanes, floods, volcanoes, droughts, tidal waves, fires) and nearest and furthest consequences causing various natural phenomena;
- Asks the pupils to find the information about the relief changes in the local environment (for example, change of riverbeds, coastline, and forest planting); differ the changes caused by the natural phenomena and the human activities.

Chapter XVII. Informative and Communicative Technologies - General Part and Standards

Article 75. Informative and Communicative Technologies - General Part

Introduction

Without informative-communicative technologies (ICT) today progress is unimagined in any field of public and public activity. Development of relevant infrastructure, creation of informational society and active involvement in world informative space is considered as the priority goal of our country. Successful solving of this task is crucial to achieving strategic goals such as the creation of a democratic, free and legal state, civil society development, security of the country, protecting the human rights, fighting against poverty and corruption, extremism and terrorism.

It is important, that active use of informative-communicative technologies not only provide technical skills in the learning process, but also create favorable conditions for the development of a free personality, national and universal values.

The use of informative-communicative technologies in the learning process has several important sides, namely:

- It promotes the connection between the subjects;
- It promotes the development of creative and innovative approaches, which are very important to make a constructive classroom environment based on the problems;
- It is possible to create and use visuals, which are needed when importing new concept, object and procedure, the examples of which are, as follows:
 - Arithmetic actions on the number when the realization of these actions is mainly made by using the subjective visualizations (on the primary level);
 - Learning the new words and phrases in the native or foreign languages, when the pupils connect the unknown words and phrases with the appropriate graphical images;
 - Simulation of such natural phenomena, which cannot be observed or very difficult in real circumstances.
- Using ICT can more effectively and intensively promote the development of the skills provided by the National Curriculum. Such as, for example:
 - Ability to discover visual or quantitative regularities (regulation in sequence of subjects, regulation in graphic representation, regulation of quantitative change);
 - Ability to set and evaluate measures of objects;
 - Comprehension of the information and ability to move from one format to another (for example: to select a graphical image for the textual material and on the contrary); to describe quantitative information spelled verbally and on the contrary);
 - Ability of spatial representation;
 - Cooperative skills;
 - Ability to prepare the work space and select the necessary means.

Promoting the digital literacy development

Besides that the use of ICT helps the pupils to achieve the results provided by the different disciplines, it also contributes to developing the competences related to the ICT. The ICT competence includes technical and cognitive abilities that enable access, use, creation, improvement and transfer of information using the instant devices. The pupils demonstrate these competences in the utilization of technologies in solving various problems, analyzing and exchanging the information, forming and developing ideas, creating different models and managing devices. All this is very important to buy the necessary digital literature in modern life. Digital literacy is a combination of knowledge, skills and attitudes that enable digital technologies to be efficient and targeted, in compliance with legislative and ethical norms, by obtaining, researching, organizing, evaluating and creating the information.

The ICT competences are a bit broader than the technical skills of using separate software, but naturally, the latter is very important. ICT competences include the correct selection and evaluation skills of ICT-communicative technologies. The pupils would like to know what informative-communicative technologies exist, when they need to use them and which device will be an adequate to the task that is to be solved. For example, when the pupils prepare the

presentation, they use ICT competences to select appropriate software, properly determine the objectives, presentation content and a design to correspond to the audience.

It can be said that today digital, as well as quantitative literature, is no less important than literacy in the traditional sense. Thus, when using the ICT on the primary level, an attention should be paid to the establishment and development of such competencies, as the use of computer-enabled devices (keyboard, mouse, screen); understanding the digital device or digital resource parameters (for example, memory, number of colors, necessary hardware resources); maintaining, processing, and presenting the principles and information of the digital device work (e.g. operating system and file concepts, as well as the fact that textual, graphic and audio equipment are stored in the same digital unit).

The use of informative-communicative technologies in the learning process helps to increase a pupil's motivation. In addition, by using ICT, it is possible to create and use more rich, varied and dynamic learning material that can help the pupils to interact with learning content. As a result, the pupil is not a passive receiver of information, but he/she can modify the content and even create it. All this is in full compliance with the modern, constructive-typing approach to the learning process, which enables the knowledge to be developed and created by the pupil himself.

Objectives and purposes of teaching informative and communicative technologies

The main objective of teaching informative and communicative technologies is to raise awareness of ethical and law-abiding persons, who are capable of utilizing effective technological advancements, which should be able to independently obtain, manipulate, process, evaluate, analyze and on the very basis make decisions independently.

After the completion of the general educational institution, the pupil should have a basic knowledge of the informative and communicative technologies, as well as a practical experience of their consumption, which will be sufficient for future professional activities and also for continuation of studying on the next level.

In the consequence of the educational goals, the curriculum envisages the solving specific tasks. Such tasks are:

1. The pupils should be able to realize the problems related to social, ethical, environmental and human factors of use ICT;
2. The pupil should be able to use ICT effectively, including solving the problems caused during the living and real situation;
3. The pupil should be able to master digital means of research (it is meant to search, store, process, analyze and make conclusions from various sources of information);
4. The pupil should be able to master the creating means for the digital production;
5. The pupil should be able to master the digital means of communication and cooperation.

Organizing the teaching of informative and communicative technologies

In the National Curriculum, informative-communicative technologies is considered as an independent subject, but ICT can be also considered as an instrument that encompasses various disciplines. Accordingly, there are defined three approaches for working out the ICT competences. These competences are, as follows:

1. ICT as an independent subject:

In the fifth and sixth classes, it is intended to work out for the beginner pupils the essential knowledge and skills: knowledge of basic devices, operating system, working at the text and multimedia data (creation, editing), operations on the files, Internet, office programs package, and etc. In the seventh and eighth classes it is continued to work out the essential knowledge and skills for the pupils, who are more mastered. Besides that, the material of the V-VI classes is repeated more deeply, it means, that the studying material is more intensified, more complex components are added to it: the difference between operating systems (more deeply) and operating systems, using an electronic spreadsheet to solve the problems, table publishing elements „, Web Design Elements”, using the email etc.

At the same time, the development of the ICT competences of the pupil is carried out within the individual subjects, the achieving results of which are defined by the general skills standard of the ICT.

2. ICT is integrated in other disciplines

The teacher of the subject has not to teach the basic aspects of the technical capabilities of the skills of ICT devices for the pupils, but he/she should create and offer the pupils a new opportunity to enhance knowledge, in which the pupils would reveal and develop those competences that they have already acquired, while learning ICT as an independent subject. So the lessons remain focused on the subject and the teachers do not concentrate to the technical details of the ICT. It is clear, that the teacher of the subject should be well aware of the fact that what competencies of ICT his/her pupils master as the offered tasks should be appropriate to these competences.

3. ICT as a selected subject:

In the selected subject there are defined two training courses, the results of which are given by the relevant standards.

- The first course is "Computer Science", which includes the informatics and programming elements: data structures (data storage, processing, trans missing methods), algorithms (algorithms concept, algorithm types, properties, recording systems), algorithms evaluative methods, algorithm software implementation;
- The second course is "Multimedia and Design", which includes web design, graphic design and multimedia elements.

Paragraph 4. Evaluations in Informative and Communicative Technologies

The essential components of the evaluations of ICT competences are internal, class and summary assignments.

The ICT competences can be used to identify various digital means, in various situations and in the formation of different types of digital material. For example, it may be an electronic table for statistical processing of quantitative data, publishing digital material in the Internet or local network, preparing a composition of literal or researching nature, solving the problem of mathematical or natural sciences with ICT support, etc.

These cases may not be explicitly separated from each other and a specific study unit, for example, the project may require use them in combination on the different levels. The activity used in the assessment and its outcome should be divided into components so that the evaluation scheme is understandable. It should also be noted that in the use of informative-communicative technologies it is not always possible to examine the competence of the pupil only by the content of the received product. Assessment of the work created by the ICT should be made not only by the contents and design of the work, but also by the technical means and the functions used by the pupil during his/her signature. This is best reflected in the digital structure of the work, such as the use of tags and styles, bookmarks, links and other means of movement in the text, in the use of an invisible table, text field, automation of numerating and listing.

The assessment should be based on the electronic portfolios of the homework component. Electronic portfolio is a collection of digital artworks / products that the pupils create and store throughout the course. In portfolios, it can be combined individual works as well as group products. The portfolio includes the list of the main issues, which the teacher should define at the beginning of the course and prepare the appropriate developing and evaluating schemes. The teacher gives a periodic assessment of the pupils' work to improve their knowledge and at last definitely evaluates their final work / product. At the end of the course, the pupils must submit their portfolios to the audience, when the final point the assessment is determined. The final evaluation of the portfolio should include the criteria such as follows:

- Learning systematization, creativity and the use of the resources rationality;
- Focus on the results of the standard and demonstrate the skills of learning independently;
- Technical sophistication of the created work, aesthetics, originality.

A summary task should satisfy the following requirements:

- From the summary assignments even one should be of complex content and should be implemented as a project, when different activities are used (e.g. work, data booking / processing, information research / search, experimentation, modeling, creation of digital product, presentation and etc.);
- Summary assignment should include almost all the outcomes of the standard;
- Each type of assignment should be accompanied by an assessment rubric that needs to be specified in accordance with the particular task conditions.

Article 76. The Informative and Communicative Technologies Standard

The Informative and Communicative Technologies on the Primary Level

Introduction

The achieving Competences for V-VI classes related to the use of informative-communicative technologies include five outcomes. According to the presented document, these competencies are set up from the first academic year of the course -V class and continue in the second year of the course. The important role in this process plays an integration of the ICT competences with other academic disciplines, the outcome of which is reflected in the ICT general skills standard. The results of the ICT reiterate the very names, which are given in the directions of the ICT general skills standard, though in turn, the results of ICT include more competency rather than it is defined by the letters.

Besides the competencies related to skills, the content of the training material is presented in the form of thematic issues.

Sub-Paragraph 2. The V-VI classes standard

A) The results to be achieved at the end of the IV class

Definition of indices

Each outcome in the standard is preceded by the index, which indicates the subject, the level of instruction and the outcome of the standard; for example, ICT.pr.1.

"ICT." - indicates the subject of "informative-communicative technologies"

"pr." - indicates the standard of V-VI classes,

"1" - indicates the standard result number.

| Informative-Communicative Technologies Standard | |
|--|--|
| Results of the Index | the standard results |
| ICT.pr.1. | The pupil should be able to follow the social, ethical and safety norms while using ICT |
| | <p>A pupil:</p> <ul style="list-style-type: none"> ➤ Using digital information understands the meaning of plagiarist; ➤ Reveals the positive social skills in the network environment; ➤ Participates in the development of school / class rules for the safe use of digital technologies and protects them using the network and digital means; ➤ Discusses about both the positive and negative aspects of the use of ICT in different fields of human activity. |
| ICT.pr.2. | The pupil should be able to use the effective and safe use of ICT |
| | <p>A pupil:</p> <ul style="list-style-type: none"> ➤ Protects the health safety norms while using digital devices of ICT; ➤ Safely and correctly uses information storage devices (hard drive, CD, DVD, Blue-Ray, flash memory, memory card) and their connectivity and / or places; ➤ Effectively utilizes the keyboard, minds the layout of the keys and their functions; ➤ Effectively uses mouse / touchpad, conveniently uses its buttons; ➤ Names the different digital means and speaks about their purpose; ➤ Turns on and turns off the computer using the appropriate function, as well as the device's turn-on/off buttons. Realizes the difference between these two ways; ➤ Recognizes various types of software (e.g. text editor, graphic editor), and functions and effectively uses some of their main functions (e.g. marking, copying, inserting, formatting); ➤ Realizes the purpose of the Hyper Text Document and uses it; ➤ Keeps available the digital material in the work process by using the relevant software functions; ➤ Creates files and folders with the logical organizing principle, for efficient storage of data, for finding and reading. |
| ICT.pr.3. | The pupil should be able to select and use different types of digital means to find information and research |
| | <p>A pupil:</p> <ul style="list-style-type: none"> ➤ Uses ICT while organizing the ideas and information in the process of research; ➤ When searching in the storage of information, uses and selects appropriate digital means; ➤ When searching the information effectively uses the spread systems has ability to select and use search keywords, phrases and their combinations; |

| | |
|------------------|--|
| | <ul style="list-style-type: none"> ➤ For the credibility of the obtained information uses several sources; discusses about the reliability of each of them. |
| ICT.pr.4. | The pupil should be able to select and use a variety of digital means while creating a digital product |
| | <p>A pupil:</p> <ul style="list-style-type: none"> ➤ Evaluates the possibilities of digital means and adequately selects the new product; ➤ Uses the discovery of ICT when discovering regularity and creating regularity (e.g. numerical sequence, deployment of figures); ➤ Taking into consideration the peculiarities of the goals and the audience, prepares the presentation / slides to introduce the own (or of group) opinions or to demonstrate the performance of the work; ➤ Realizes the difference between presentation and other visual and reading material; ➤ Makes effective combinations of text, graphics and audio material; ➤ In the creation of a digital work / product, combines text, graphic and audio material |
| ICT.pr.5. | The pupil should be able to select and use a variety of digital means for communication and cooperation |
| | <p>A pupil:</p> <ul style="list-style-type: none"> ➤ Uses ICT for making communication with the school community with the purpose of searching digital information, creating digital material and improving its quality; ➤ Protects the rules of the correct use of communications (for example, protecting network security rules, norms of privacy information, access to digital resources norms). |

B) The Recommendation Content

Computer and related devices

- Computer design and its components (e.g. processor, RAM, mother board);
- Information-driven devices and their purpose (e.g. keyboard, microphone, scanner, web camera, monitor, printer, speakers / headphones, mouse / touchpad, joystick);
- Content storage devices (e.g. hard drive, CD, DVD, BRD, flash memory, memory card, external hard drive);
- Keyboard, button groups and their purpose;
-

Operating system and its functions

- Turn on digital device and system startup stages;
- Disconnect and restart. The difference between the program shutdown and turn off from power source;
- Sign in and log in the operating system;
- Various conditions of the system and the difference between them (e.g. difference between the condition when the computer is disconnected from the network and savings regime);
- Computer software. Hierarchical structure of software;
- The purpose of the operating system and its components;
- Graphic elements of the operating system's user interface and their purpose. Interact with System standard consumer programs;
- Run the program and finish the program work;
- The concept of file and folder. Folder actions (e.g. create, delete, copy, and move);
- Creating a file using various consumer programs;
- Related actions to the files (e. g. copy, revise, delete, restore deleted file, grouping files in folders);
- Read the stored material by using relevant software functions (e.g. "Open", "Import");
- Digital Content Measurement Units.
- graphical elements through mouse / touchpad;

Graphic editor

- Creating a picture by the combination of graphic elements (for example, geometric figures), prepared in advance;
- Color concept, color parameters, color digital generation: getting the different colors by modifying the color parameters;
- Operations on the graphical objects using different devices;
- Geometric transformations on the graphic elements of the image (e.g. rotate, symmetry, stretching);
- Drawing - Coordinate System;
- Picture dimensions and resolution, changing them;
- Inserting a text in the desired location in the picture;
- Color filter and its use;
- Graphic effects and use of them in relation to the graphical elements the picture consists of;
- Importing and placing graphic elements in the picture; inspection before printing and printing.

| Text editor | Presentation program | Electronic tables |
|---|--|--|
| <ul style="list-style-type: none"> ➤ 1. Creation of a new document, presentation, ledger; use of the template; ➤ 2. The concept of font and its parameters, the peculiarities of the Georgian font; ➤ 3. Memory buffer; ➤ 4. Search for information in the file, replace one fragment with another; ➤ 5. Spreadsheets and information by means of a table; ➤ 6. Images and figures; ➤ 7. Diagrams, graphic schemas, text frame; ➤ 8. Symbols and mathematical expressions; ➤ 9. Use of keyboards, "hot" keys; ➤ 10. Page settings, print preview and printing; ➤ 11. Cancel / repeat the latest actions. | | |
| <ul style="list-style-type: none"> • Formatting the paragraph, text style. | <ul style="list-style-type: none"> • Actions on slides: create, delete, move, and hide; • Animation on slide objects; • Transition effects between slides, to automate transition; • Presentation display modes. | <ul style="list-style-type: none"> • Data Types • Formulas and frequently used functions |

Internet

- Web browser and its user interface;
- Website and its consisting components;
- Hyperlink and its corresponding address;
- Searching engines and searching engine syntax;
- Ethical and legislative norms related to the use of the material programed in the Internet.
Legislative norms; Copyright.