PRODUCTION + INTEGRATED LABORATORY EQUIPMENT

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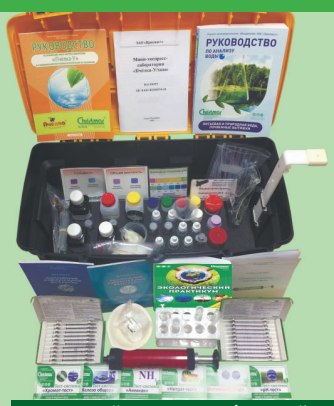
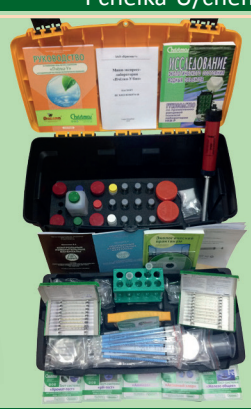
Developer and manufacturer is CJSC Christmas+

"PCHELKA-U"
MINI-EXPRESS LABORATORY AND ITS MODIFICATIONS

ANALYZE – GENERALIZE – MAKE CONCLUSIONS



"Pchelka-U/chem"



"Pchelka-U/bio"

"Pchelka-U/soil"

"Pchelka-U/m"

Пчелка®

The products are manufactured under the registered trademark "Pchelka" (certificate No. 357416). "Pchelka-U" is the owner of the distinctive mark "Recommended by the pedagogical community".

"Pchelka-U"

Purpose and scope of application

"Pchelka-U" mini-express laboratory (thereinafter – "Pchelka-U") and its modifications, developed and produced by CJSC Christmas+, are intended for conducting an ecological practicum and educational research work related to the primary study of environmental objects (air, water, soil, food – depending on the modification).

"Pchelka-U" mini-express laboratories allow in practice to familiarize pupils with the methods and technologies of ecological (biological-ecological, chemical-ecological) express control of the environment at the initial level, to acquire the appropriate skills and abilities.

"Pchelka-U" mini-express laboratories in various modifications are used for field and laboratory ecological (chemical-ecological, biological-ecological, etc.) student research and practical training, as well as demonstration experiments in ecology, chemistry, biology, geography, life safety, in the relevant specialized courses in the systems of general secondary, vocational and additional education.

They allow to conduct an experiment in various forms of organizing pupil work: frontal, individual and group. The place of work can be both a school office and a training laboratory. "Pchelka-U" mini-express laboratories are irreplaceable in the field and expeditionary conditions. Work can be carried out within the framework of the lesson, as well as in various forms of extracurricular work and in the system of additional education.

Modifications

"Pchelka-U" is a modification of universal application, containing a wide range of means of chemical express control of environmental objects. Designed for practical work of introductory (initial) and intermediate levels with simple tests;

"Pchelka-U/chem" is a modification designed for training in chemical and environmental orientation of medium and high levels of complexity, for organizing a laboratory experiment, laboratory and practical training;

"Pchelka-U/bio" is a modification intended for use in educational complex biological and ecological researches, as well as during the corresponding practicums. Allows to conduct classes on bioindication and biomonitoring of water bodies by determining various biotic indices (Woodywiss, Mayer, stream biotic index);

"Pchelka-U/soil" is a modification specially designed for studies of the ecological state of soil of medium and high levels of complexity, with a focus on the issues of soil science, agricultural chemistry and agronomy, for the organization of laboratory experiments, laboratory and practical exercises;

"**Pchelka-U/m"** is a modification designed to determine the amount of carbon dioxide in the air, test assessment of the chemical composition of water and soil when working as part of an environmental practicum set produced by CJSC Christmas+.

We are always open for cooperation!

BEWARE OF IMITATIONS!

Methods for determining indicators of the state of the environment

"Pchelka-U" mini-express laboratories use chemical (and hydrobiological – "Pchelka-U/bio") methods of assessing the state of the environment with the help of ready-to-use indicator means developed and produced by CJSC Christmas+ (see table 2).

"Pchelka-U" in its various modifications is a part of:

- a typical set of equipment for the "Environmental Practicum" laboratory (class-package);
- a set of control equipment for the "Life Safety and Ecology" (LSF) laboratory;
- "I am an ecologist" multifunctional laboratory;
- various recommended lists of equipment at the regional and national level.

Content

Mini-express laboratories are functionally integral educational and methodological packages containing indicator means, accessories, special tools and study guides. The tooling is placed in rigid, portable, easy-to-carry containers with different types of packing, containing, depending on the modification, individual cradle structures made of modern materials. Packing in boxes is allowed.

Containers and cradles are ergonomic and reliably store the contents of mini-express laboratories during operation, transportation and storage of products.

Indicator means included in the "Pchelka-U" mini-express laboratories make it possible to perform (see also Table 1):

- indicator tubes – 30 air analyzes;
- "Ammonia" test system – 50 air analyzes;
- test systems – at least 500 analyzes of water and aquatic environments, soil extracts for 5 components;
- "Nitrate-test" system – sanitary and food control, including fruit, vegetables, juices, natural and drinking water control, etc;
- test and analytical solutions (specially prepared, ready-to-use solutions of reagents in sealed vials made of chemically resistant materials, are incuded to "Pchelka-U/chem", "Pchelka-U/soil") – 300 and more analyzes by 6 indicators.

Depending on the components to be determined and the analyzed media, quantitative and semi-quantitative analyzes, as well as qualitative (indicative) assessments, are performed.

Quantitative analysis is performed using indicator tubes (air analysis), as well as test and analytical solutions (analysis of water and aqueous media, soil extracts and model solutions).

"Pchelka-U" modifications include reagents and accessories for the preparation of model air mixtures and solutions, the work with which makes it possible to reproduce the real factors of chemical impact on the environment on the scale of an educational experiment.

Semi-quantitative and qualitative analysis of the air environment, as well as water and aqueous solutions, soil extracts and model solutions, is performed using test systems included in the mini-express laboratory.

Table 1

Indicator mean and controlled environment	Method
Indicator tubes Air environment	Coloristic, aspiration
Ammonia vapor test system Air environment	Visual colorimetric, non-aspirated
Test systems Water and aqueous solutions, fruits, vegetables and juices, soil extracts and model solutions	Visual colorimetric
Test and analytical solutions ("Pchelka-U/chem", "Pchelka-U/soil") Water and aqueous solutions, soil extracts and model solutions	Titrimetric (chloride, carbonate, bicarbonate, sulfate, total hardness), visual colorimetric (pH)
A hydrobiological set and a special hydrobiological landing net (a hydrobiological network is also available on request)	Hydrobiological, visual

Main technical characteristics

Weight – no more than 4 kg (one portable rigid container with a handle).
Overall dimensions of containers (approximately): mini-case – 400×370×80 mm, box – 320×220×110 mm, container – 510×260×230 mm.
They do not require water and electricity sources.
The shelf life is determined by the usefulness of the indicator and test means and ranges from 1 to 2 years.

Information about methodology and technology of application

"Pchelka-U" mini-express laboratories are included in the lists of equipment recommended for school classrooms of chemistry, biology, ecology, geography, life safety and for out-of-school / additional education by the decision of the Problem-Methodical Council "Teaching Means, Informatics and Informatization of Education" Institutions of the Russian Academy of Education "Institute of Content and Teaching Methods" (minutes of April 04, 2013).

"Pchelka-U" mini-express laboratories, developed and mass-produced by the team of CJSC Christmas+ for more than twenty years, are widely and successfully used in the practice of educational activities of many institutions of general secondary, vocational and additional education.

Products are regularly updated in accordance with the needs of the educational process, new pedagogical technologies, reviews and wishes of specialists.

Table 2

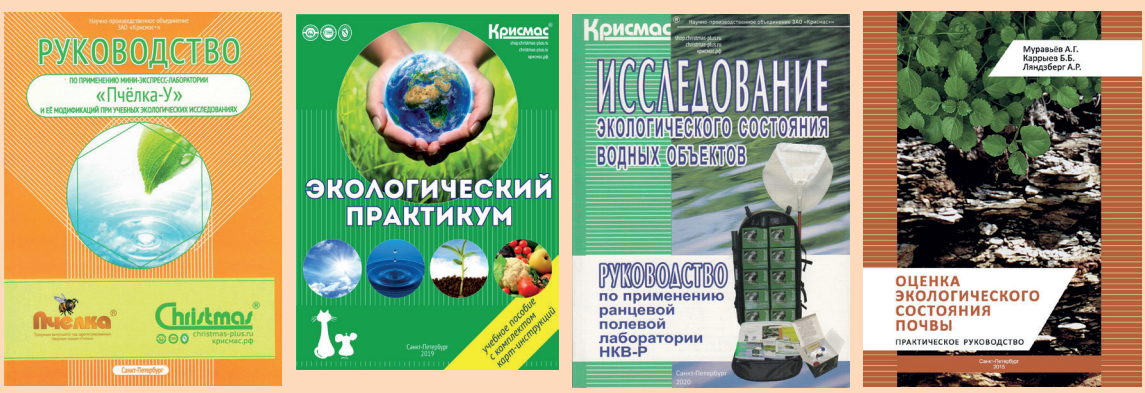
Subject of research	Applied express tools	Analyzed compounds / pollutants				
		"Pchelka-U"	"Pchelka-U/m"	"Pchelka-U/chem"	"Pchelka-U/bio"	"Pchelka-U/ Soil"
1. Air, model chemical air pollution	1. Indicator tubes, with aspirator	CO_2, NO_2, SO_2	CO_2	CO_2, SO_2, O_2	CO_2, NO_2, O_2	Not performed
	2. "Ammonia' test system	NH_3	NH_3	NH_3	NH_3	
2. Water, model chemical water pollution	1. Test systems	Active chlorine, total Fe, NO_3^-, Cr (VI), pH	Active chlorine, total Fe, NO_3^-, Cr (VI), pH	Active chlorine, total Fe, NO_3^-, Cr (VI), pH	Active chlorine, total Fe, NO_3^-, Cr (VI), pH	Active chlorine, total Fe, NO_3^-, Cr (VI), pH
	2. Test and analytical solutions	Not performed	Not performed	CO_3^{2-}, HCO_3^-, Cl^-, SO_4^{2-}, total hardness, pH	Not performed	CO_3^{2-}, HCO_3^-, Cl^-, SO_4^{2-}, total hardness, pH
3. Soil extracts, model chemical soil contamination	1. Test systems	Active chlorine, total Fe, NO_3^-, Cr (VI), pH (soil acidity)	Active chlorine, total Fe, NO_3^-, Cr (VI), pH (soil acidity)	Active chlorine, total Fe, NO_3^-, Cr (VI), pH (soil acidity)	Active chlorine, total Fe, NO_3^-, Cr (VI), pH (soil acidity)	Active chlorine, total Fe, NO_3^-, Cr (VI), pH (soil acidity)
	2. Test and analytical solutions	Not performed	Not performed	CO_3^{2-}, HCO_3^-, Cl^-, SO_4^{2-}, (acidity), soil salinity, the content of Ca and Mg salts by the total hardness in the soil extract	Not performed	CO_3^{2-}, HCO_3^-, Cl^-, SO_4^{2-}, (acidity), soil salinity, the content of Ca and Mg salts by the total hardness in the soil extract
4. Salts and bulk media (fertilizers, hazardous chemicals, salts of unknown origin, etc.	1. Test systems	Active chlorine, total Fe, NO_3^-, Cr (VI), pH	Active chlorine, total Fe, NO_3^-, Cr (VI), pH	Active chlorine, total Fe, NO_3^-, Cr (VI), pH	Active chlorine, total Fe, NO_3^-, Cr (VI), pH	Active chlorine, total Fe, NO_3^-, Cr (VI), pH
	2. Test and analytical solutions	Not performed	Not performed	CO_3^{2-}, HCO_3^-, Cl-, SO_4^{2-}	Not performed	CO_3^{2-}, HCO_3^-, Cl-, SO_4^{2-}
5. Vegetables, fruits, juices	"Nitrate test" system	NO_3^-	NO_3^-	NO_3^-	NO_3^-	NO_3^-
6. State of the community of aquatic organisms with the calculation of hydrobiological indices	Hybrobiological set with a net (on request with a hydrobiological mesh)	Not performed	Not performed	Not performed	Assessment of the state of the reservoir (assessment of communities) with the calculation of the Woodywiss and Mayer indices, the rating of the stream	Not performed

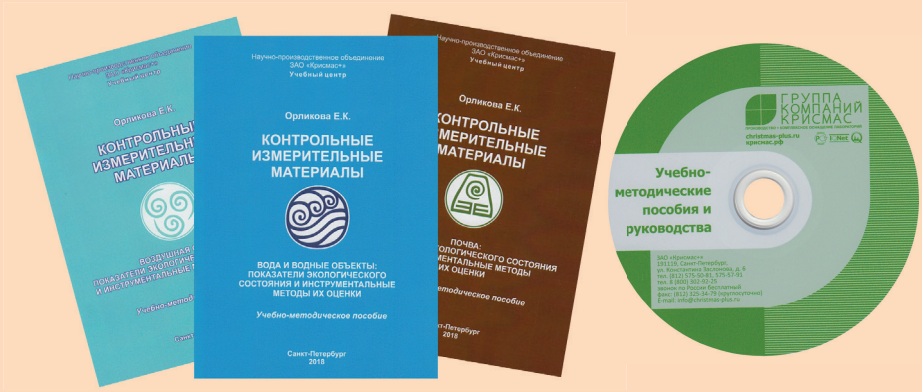
Supply contents

The specific contents of the “Pchelka-U” modifications, including educational and methodological literature, is determined by the directions of practical work.

“Pchelka-U” mini-express laboratories include:

- indicator tubes for monitoring carbon oxides (IV), nitrogen dioxide and sulfur oxide (IV) in the air, oxygen;
- test system for monitoring ammonia vapors in the air (“Ammonia” test system);
- test systems for monitoring the contamination of water and aqueous solutions, soil and bulk materials (“pH test”, “Total iron”, “Chromate test”, “Active chlorine”), as well as fruits, vegetables, juices, etc. (“Nitrate test”);
- aspirator NP-4 or similar type with a passport;
- solutions and reagents, chamber for preparation of model air pollution;
- accessories (scissors, tweezers, a spatula, a magnifying glass, graduated calibrated tubes, plastic bags, polymer pipettes, a tray (16×26 cm), glass slides, a polymer container, a glass for preparing soil extracts, paper filters, napkins, a tripod for test tubes);
- personal protective equipment (glasses, gloves);
- operational documentation;
- illustrated teaching aids (Christmas+ printed editions):
  - — “Guidelines for the use of the “Pchelka-U” mini-express laboratory and its modifications in educational environmental studies”;
  - — “Environmental practicum: Study guide with a set of instruction cards”;
  - — “Study of the ecological state of water bodies”;
  - — “Assessment of the ecological state of the soil”;
  - — “Control measuring materials” on the topics: air, water and water bodies, soil;
  - — CD “Teaching aids and guidelines”.





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The quality management system of the company is certified for compliance with the requirements of the international standard ISO 9001