

Digital laboratory for the biology classroom (student set)

LABOTRIX SENSE BIO L4

PRODUCT PASSPORT

Kyiv

2026

1. Basic product information

- 1.1. Product name — Digital laboratory for the biology classroom (student kit).
- 1.2. Trademark — Labotrix.
- 1.3. Model — Sense Bio L4; full trade name — LABOTRIX SENSE BIO L4.
- 1.4. Manufacturer — Labotrix Group Limited, China.
- 1.5. Intended use: The kit is intended for laboratory, practical and research work of students in biology and related subjects of the natural cycle: it allows you to measure temperature, illumination, humidity of air and soil, as well as acidity and electrical conductivity of aqueous solutions. The kit is designed for the work of one student group - individually or in pairs at one workplace; each sensor is autonomous, so several kits can work simultaneously in different corners of the office or on the school site. The teacher conducts frontal demonstration experiments in front of the whole class with his own, teacher's laboratory kit - this kit does not provide for such a scale. The kit is used when studying ecology, plant physiology and the basics of field observation methods. The platform combines hardware, multimedia content, and elements of generative artificial intelligence, which makes classes inclusive and exciting: working with the learning platform develops attention, logical and imaginative thinking, creativity, and collaboration skills, and students complete tasks individually or in pairs, training learning independence and interaction.
- 1.6. Design features: The kit includes six wireless sensors; each of them is equipped with a color liquid crystal display with a diagonal of at least 1.8 inches and shows the measurement result directly on its case, without the need to connect to a computer. The devices work completely independently - a separate data logger or external analog-to-digital converter is not required to take readings. If necessary, several sensors simultaneously send measured values to a computer or mobile device, where the accompanying program with an interface in Ukrainian forms tables and graphs and allows you to upload results to a spreadsheet editor. The sensors and accessories are carried and stored in a compact box with a housing-insert that fixes each device in a separate cell.
- 1.7. Digital learning support: The product includes access to an online teaching support course hosted in a learning management system (LMS) and designed for 70 academic hours of classes. The course is designed to meet the current curricula of secondary education institutions in Ukraine. The materials are grouped into research modules in the disciplines of physics, biology, chemistry, STEM, and each topic contains a lesson plan, a list of necessary supplies, an experiment scenario, step-by-step instructions for laboratory work with an explanation of the expected result, a video demonstration of work methods, interactive exercises and tasks for independent study and for project activities, suitable for both individual and group work. All modules are designed for this equipment and tested on it, so the course

works in a direct chain of "equipment → methodology → learning results." The course has a built-in assistant based on a language model with a search through the course knowledge base (Retrieval-Augmented Generation): based on the topic of the lesson, it selects relevant experiments, methodically describes the sequence of conducting the research, analyzes typical student errors and gives personal advice on how to get rid of them, changes the level of complexity to prepare for a specific class, and helps to write a research report and organize the conclusions. The assistant's knowledge base is localized and aligned with the Ukrainian curriculum. The license for the course and accompanying software is valid for 12 months from the date of access transfer. The course content and assistant answers are provided in Ukrainian, and the learning platform interface is multilingual: Ukrainian localization is enabled by default, the English interface is available as an option.

- 1.8. Processing of the measured data on the platform: The sensors of the kit transmit the measurement results to the electronic platform automatically - the student does not copy the display from the screen or enter numbers by hand. The built-in artificial intelligence agent already works with this array: it builds graphs and tables from it, processes the results obtained, shows the patterns that appeared during the experiment, compares the measured with the reference values for this work and leads the student to independently formulate a hypothesis, conclusion and interpretation, keeping him within the given "corridor of knowledge" - it does not prompt a ready-made answer, but narrows the search to the right direction. Work with the platform is built in such a way that it is suitable for both individual performance and group work.

2. Technical specifications

- Brand — Labotrix
- Model — Sense Bio L4
- The article is LTX-SENSE-BIO-L4
- Product type — digital laboratory for biological and environmental research, kit for one student workstation
- Number of sensors in the kit (pieces) — 6
- Types of sensors included in the kit — temperature sensor, light sensor, air humidity sensor, soil moisture sensor, water quality sensor (pH), conductivity sensor
- Temperature sensor — resolution 0.01 °C within the range from -50 to +200 °C
- Light sensor - 1 lux resolution within 0–8000 lux
- Humidity sensor - resolution 0.1% within 0-100%
- Soil moisture sensor - 0.1% resolution within 0–100%
- Water quality sensor (pH) — resolution 0.01 pH within 0–14 pH
- Conductivity sensor — resolution 1 µS/cm within 0–20 000 µS/cm
- The sensor screen is a color liquid crystal, the diagonal is not less than 1.8 inches, the readings are visible immediately on the device body

- Method of connection with a computer, a mobile device or a cloud service — wireless (Bluetooth), a wired connection via USB is additionally supported
- Autonomy of the sensors — measurement and data transmission without a datalogger and without an additional analog-to-digital converter
- Power source of the sensors — built-in rechargeable battery (without replaceable batteries)
- Frequency of recharging the batteries of the sensors — not less than once a quarter
- Software — display of the data in tables and graphs, export of the results to spreadsheet editors
- Software compatibility — with the operating system of the device used in the educational institution
- The software interface language is Ukrainian by default, English is available as an option.
- Digital learning support — online course in a learning management system (LMS)
- Course volume (academic hour) — 70
- Course subjects — physics, biology, chemistry, STEM
- Composition of the materials — research modules, experiment scenarios, step-by-step laboratory work instructions, video demonstrations, interactive exercises and tasks
- Compatibility of the materials with the equipment — full, along the chain "equipment → methodology → learning outcomes"
- Language-model-based assistant — built into the course, with retrieval over a localized knowledge base (Retrieval-Augmented Generation)
- Validity period of the license for the course and the software (month) — 12
- Language of the course and of the answers of the assistant — Ukrainian; interface of the platform — multilingual, the Ukrainian localization by default, an English-language interface available as an option
- Transfer of the results to the platform — automatic, without manual entry of numbers
- Processing of the measured data by the artificial intelligence agent — plotting of graphs and tables, analysis of the results, identification of the patterns of the experiment
- Comparison with reference values — provided for every laboratory work of the course
- Support in formulating the conclusions — within the defined "knowledge corridor", without a ready answer
- Language of marking and operating documentation — Ukrainian
- Product marking — trademark, model and a space for the inventory number
- Packaging — individual box of corrugated cardboard with the contents secured
- Documentation supplied — product passport with warranty card, operating manual and teaching guide for the teacher and for the student

- Operating conditions — premises of an educational institution, air temperature from +5 to +40 °C, relative humidity from 40 to 60 % without condensate
- Care of the sensor surfaces — wiping with a dry or slightly damp cloth is permitted
- Organization of work - a set for one student's workstation; the teacher leads a frontal demonstration to the class with his own set
- Suitability for field conditions - the probe of soil moisture and water quality sensors is suitable for immersion in natural samples outside the classroom (school site, reservoir)
- User requirements — pH sensor calibration and workplace preparation are performed by the teacher, students work under supervision
- Service life (year) — 5
- Warranty period (month) — 12

3. Equipment

- Wireless temperature sensor — 1 pcs
- Wireless illumination sensor — 1 pcs
- Wireless humidity sensor — 1 pc.
- Wireless soil moisture sensor — 1 pc.
- Wireless water quality sensor (pH) — 1 pc.
- Wireless conductivity sensor — 1 pc.
- Box (case) with a foam insert liner for the sensors — 1 pcs
- Right of access to the online course with a language-model-based assistant (license) — 1 pcs
- Operating manual and methodological materials for the teacher and the student for experiments - 1 pc.
- Software (download link) — 1 set
- USB cable for connection with a computer — 1 pcs
- Product Passport and Warranty Card — 1 pcs
- Individual transport packaging — 1 pcs

The sensors are equipped with built-in batteries; before first use, fully charge them using the USB cable included in the kit. Soil and water samples for experiments are prepared by the teacher himself. The system requires software installation before first use.

4. Safety measures

4.1. General requirements

- Read this passport and the operating manual before first use and keep them with the product.
- The kit is intended for work by one student or a pair of students under the guidance of a teacher or laboratory assistant who has been instructed in

occupational safety; independent work by students without adult supervision is prohibited.

- Inspect the unpacked kit to detect possible damage: sensors with cracked housings, moisture inside, or a damaged probe must not be used.
- Do not immerse the sensors in the liquid deeper than the marked immersion limit and do not leave them in the sample longer than necessary for the measurement.
- Make sure students do not pull the sensor by the probe or cable, as this may damage the sensitive element.

4.2. Electrical safety

- The sensors are powered by built-in low-voltage rechargeable batteries, which is safe for the user.
- Charge the batteries of the sensors only with the standard USB cable from the set, following the operating manual.
- Do not short-circuit the contacts of the charging port with metal objects.
- Do not leave sensors turned on near sources of moisture or on open ground during precipitation.

4.3. Working with soil and water samples

- Prepare samples for experiments (water, soil solution) in clean containers; after completing the measurement, dispose of the sample according to the laboratory rules.
- After contact with a sample, wipe the pH or conductivity sensor electrode with a clean, damp cloth before immersing it in the next sample to prevent cross-contamination.
- Do not taste or smell the solutions being tested; wash your hands after completing the work.
- Remove the soil moisture sensor from the soil smoothly, without sudden jerks, so as not to bend the probe.

4.4. It is strictly forbidden

- Immerse sensors in concentrated acids, alkalis or organic solvents.
- Dropping the sensors, squeezing their housing or subjecting them to impacts.
- Disassemble sensors and repair electronic parts yourself.
- Leave the sensors in direct sunlight or near heaters for long periods of time.
- Do not use a sensor with a damaged probe or screen until contacting a service center.

5. Preparation for work

- 5.1. Unpack the kit and check its completeness according to section 3 of this passport; we recommend that you keep the packaging for further storage and transportation.
- 5.2. Inspect each sensor for cracks in the housing, moisture under the screen, and damage to the probe.

- 5.3. Before first use, fully charge the built-in batteries of each sensor using the USB cable provided.
- 5.4. Install the software on your computer or mobile device according to the instructions in the user manual.
- 5.5. Turn on the sensors one by one and make sure that each one appears in the list of active devices in the program.
- 5.6. Before regular use of the pH sensor, the teacher calibrates it with buffer solutions available in the classroom (pH 4, 7, 10) according to the software instructions.
- 5.7. Review the course materials to select an experiment that matches the topic of the lesson.

6. Procedure

6.1. Sensor preparation and experiment selection

- Turn on the desired sensor and wait for the program to detect the connection to your computer or mobile device.
- Choose an experiment in the course materials and prepare a sample (soil, water) or an observation site (plant area, illuminated surface).

6.2. Measurement of environmental indicators

- To measure temperature and light, place the sensor in the observation area or mount it on a tripod; for humidity, hold the sensor next to the object of study.
- The value on the sensor screen is updated in real time; to record a series of readings, start logging in the software.

6.3. Measurement of soil and water samples

- Immerse the soil moisture sensor probe into the prepared soil sample to the depth specified in the methodical materials.
- Immerse the pH or conductivity sensor electrode into the sample so that the sensing element is completely covered by the liquid, and wait for the reading to stabilize.

6.4. Processing results and completing work

- Save the data obtained in the format offered by the software and, if necessary, export them to a spreadsheet editor.
- Use built-in analysis tools to build graphs and formulate research conclusions.
- Turn off the sensors, rinse and dry the probes that came into contact with the samples, and return the devices to their boxes.

6.5. Working with an online course

- Obtain an account at the educational institution and activate the right of access to the course; the validity period of the license is counted from the date on which access is transferred.

- Select the topic of the lesson in the course list: every topic is accompanied by a plan, a list of equipment, an experiment scenario, a step-by-step instruction, a video demonstration and interactive tasks.
- Formulate a query to the assistant on the topic of the lesson — it will suggest appropriate experiments, set out the sequence of actions, examine typical errors and advise how to correct them.
- Set the level of difficulty of the tasks to match the preparation of the class; on the basis of the results of the work the assistant will help to draw up the report and to organize the conclusions.
- Start recording the sensor readings: the data arrive at the platform automatically, there is no need to copy them out manually.
- Open the graph or the table of the measured values and ask the agent to process the result: it will show the patterns, compare the data with the reference values of the work and lead the student to formulating a hypothesis and a conclusion.

7. Care, maintenance and possible malfunctions

7.1. Cleaning

- Wipe the sensors and their probes with a soft, damp cloth immediately after contact with soil or water.
- Do not use abrasive sponges, solvents, or alcohol to clean the housings and screens.
- Rinse the pH sensor electrode with clean water after use and store according to the manual's recommendations to prevent the membrane from drying out.
- Dry the sensors before returning them to the box to avoid condensation inside the housing.

7.2. Periodic control

- Check the condition of the probes, screens, and charging port cover at least once a month.
- Periodically check the accuracy of the pH sensor with buffer solutions and recalibrate it if necessary.
- Repair and replacement of damaged sensors is performed only by an authorized service center.

7.3. Possible malfunctions and ways to eliminate them

Symptom	Possible cause	User actions
The sensor does not appear in the device list of the software	Battery is low or sensor is off; wireless module is turned off on computer	Charge the sensor battery, turn on the sensor; turn on the computer wireless module

Symptom	Possible cause	User actions
pH readings are unstable or clearly incorrect	Electrode is not calibrated or dirty.	Rinse the electrode with distilled water and recalibrate the sensor.
Soil moisture sensor shows low values	The probe is not immersed deep enough or in a dry layer of soil	Immerse the probe to the recommended depth in the moistened soil layer.
The conductivity value hardly changes between samples	The electrode was not washed after the previous test.	Rinse the electrode with clean water between samples and repeat the measurement.
The software does not see any sensors	Outdated wireless driver; too many active applications	Update the driver, restart the program, close unnecessary applications
The sensor display goes out during operation	The battery is low or the screen has automatically turned off.	Charge the battery; tap the button on the case to reactivate

8. Storage and transportation conditions

- Store the kit in a dry, closed room at a temperature of +5 °C to +40 °C and a relative humidity of up to 80% without condensation.
- Before long-term storage (more than a month), check and, if necessary, recharge the sensor batteries, and dry the probes that have been in contact with water or soil.
- Protect the sensors from direct sunlight, dust, and sudden temperature changes.
- Transport the set in the original or a similar rigid packaging, with the sensors secured in the cells of the foam insert.
- Do not place heavy objects on the packaging with the set.
- The storage period before commissioning is unlimited provided that the stated requirements are observed.

9. Warranty obligations

- 9.1. The warranty period of the product is 12 months from the date of sale specified in the warranty card.
- 9.2. The manufacturer guarantees that the product complies with the declared technical characteristics, provided that the rules for transportation, storage and operation set out in this passport are followed.

- 9.3. During the warranty period, product defects that have arisen due to the manufacturer's fault will be eliminated free of charge. The method of elimination (repair, component replacement or product replacement) is determined by the service center.
- 9.4. Warranty service is provided upon receipt of a correctly and completely filled out warranty card and a document confirming the fact and date of purchase.
- 9.5. The warranty does not apply to cases where the malfunction is caused by:
- mechanical damage, in particular cracks, chips and deformation of the housing and of the components of the product;
 - violation of the operating, storage or transportation rules set out in this passport;
 - ingress of liquid or foreign objects into the product, and also the action of insects and animals;
 - independent disassembly, repair or modification of the product, in particular repair at unauthorized workshops;
 - use of the product other than for its intended purpose;
 - force majeure circumstances (fire, flood, earthquake, etc.).
- 9.6. The warranty does not apply to natural wear and tear of the coating and appearance of the product, as well as to consumables.

10. Product disposal

- The product must not be disposed of together with unsorted municipal waste. This is indicated by the marking in the form of a crossed-out container on the product or its packaging.
- After the end of the service life, hand the product over to a collection point for the corresponding waste or to an organization holding the appropriate permit.
- Hand over the packaging elements (cardboard, polymer materials) to the corresponding streams of recyclable materials.

Contacts

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Conditions of use and storage of the product

The product is intended for educational work in general secondary education institutions and is used only under the control and supervision of a teaching staff member; the recommended age of students — from 10 years, that is, students of grade 5 and of higher grades. Keep the product in a dry, clean and ventilated room at a temperature from +5 to +40 °C and relative air humidity up to 80 % without condensation, separately from heat sources and out of direct sunlight, moisture and dust. Use the product exclusively for its intended purpose and do not allow drops, impacts or other mechanical damage. If you notice damage, a crack or any malfunction, stop working with the product immediately and inform the teacher or the responsible person of the educational institution; repairing the product on your own is prohibited.

WARRANTY CARD

Product name:	Digital laboratory for the biology classroom (student set)
Product model:	LABOTRIX SENSE BIO L4
Serial number:	
Date of sale:	
Warranty period:	12 months from the date of sale
Trading organization:	
Signature of the seller:	

The goods have been received in working order, without visible damage, complete, and have been checked in my presence. I have no claims regarding the quality of the goods; I have read and agree to the operating and warranty service conditions.

Full name of the buyer

Buyer's phone number Buyer's signature

Dear Customer!

Thank you for choosing Labotrix products. After-sales service of this product is provided in accordance with the regulations of the company and the legislation of the country of sale. So that we can serve you quickly and without unnecessary formalities, check that this warranty card is filled in correctly at the moment of purchase and keep it together with the payment document throughout the entire warranty period. When applying for repair, hand the product over to the seller or to the service center together with the filled-in card.

Procedure for applying

1. The right to free warranty service for the product is valid for 12 months from the date of sale specified in the warranty card. Within this period, components that have failed due to a manufacturing defect are repaired or replaced without payment from the buyer.
2. Before contacting, make sure that the malfunction is not caused by the reasons listed in section 9 of this passport, and if possible, use the table of possible malfunctions in section 7.3.
3. After the 12-month warranty period, repairs are carried out for a fee; the cost of work and spare parts is determined depending on the nature of the malfunction.

Grounds for refusal of warranty service

The company reserves the right to refuse free service or to perform the work on a paid basis if at least one of the following circumstances is established:

- absence of the warranty card, its incomplete or corrected completion, and also the absence of a document confirming the purchase;
- non-conformity of the serial number of the product with the number specified in the card, or damage to the factory marking;
- traces of independent disassembly, repair or modification of the product;
- damage caused by violation of the operating rules, connection to an unsuitable power source or external mechanical impact;
- damage as a result of force majeure circumstances.

Service Records

Date of entry	Description of the malfunction	Work performed	Position, signature, full name of the responsible person