LabsLand

Real laboratories online

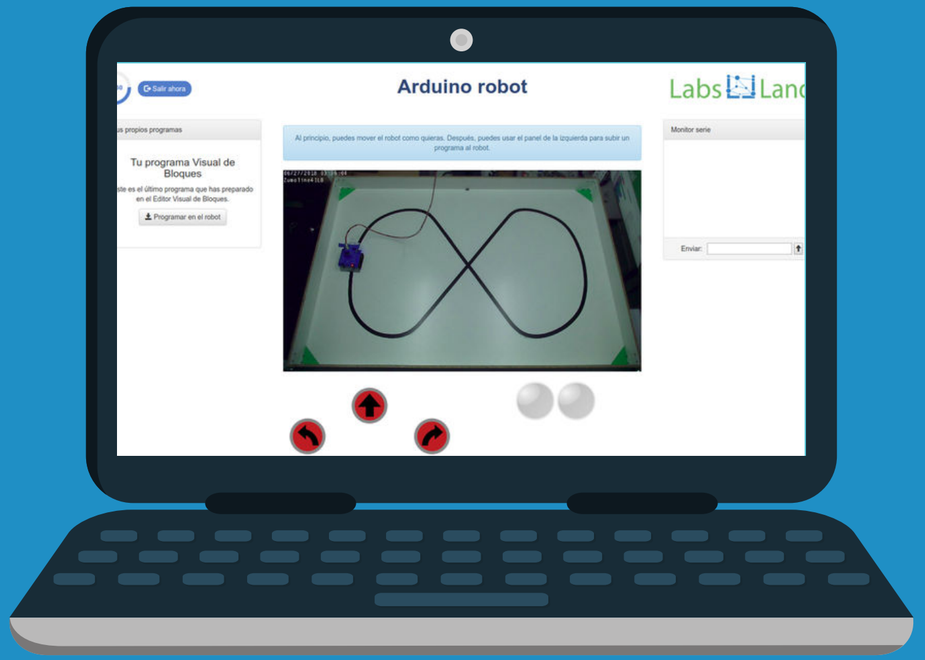
October 2025

Table of contents

Our product

Laboratory example

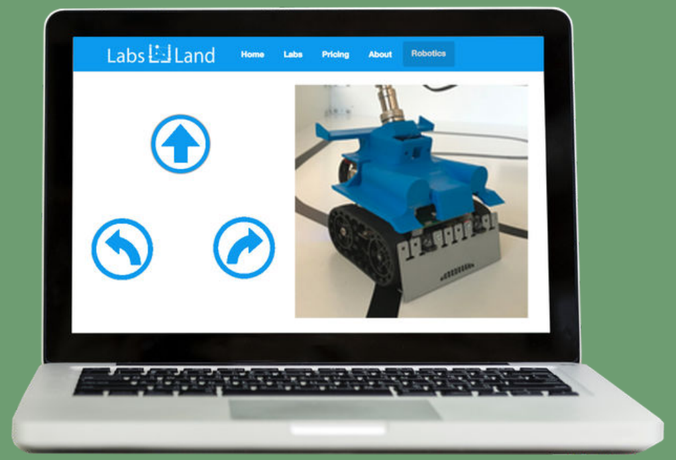
Robotics laboratory: students write code and watch it run on a real robot in real time.



LabsLand

Our product focuses on access to real-time laboratories. The laboratories on the LabsLand platform are provided and developed by different partners, usually educational institutions such as universities, in collaboration with LabsLand. This approach encourages the creation of new laboratories, allowing the LabsLand offering to grow faster. At the same time, institutions receive several benefits that encourage them to participate in this way.

- View and interact with real devices
- Use it from anywhere, at any time
- The equipment is real, not simulated. It is hosted by LabsLand or partner institutions.



Available laboratories

Biology laboratories

Planarians

Microscope

Cellular respiration

Plant tissues

Technology laboratories

Arduino Robot

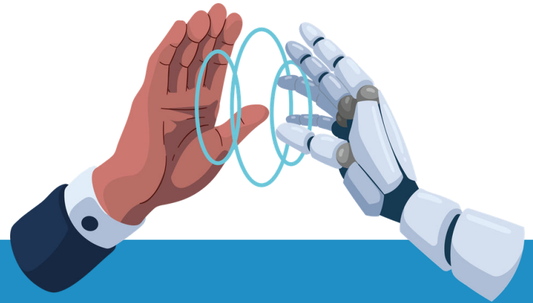
Basic Arduino

Electronics

AC Electronics

3D Printer

Digital Trainer



Chemistry laboratories

Gay-Lussac's Law

Boyle's Law

Cooling and Heating Curves

Diffusion

Acid-base titration I

Acid-base titration II

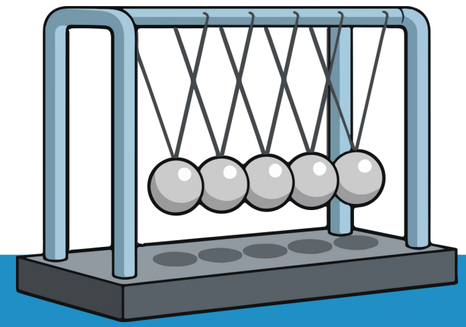
Available laboratories

Physics laboratories

Radioactivity
Kinematics
Archimedes
Pendulum
Thermal expansion
Lens types
Spring
Basic buoyancy

Advanced buoyancy
Boyle's Law
Rolling car
Electronics
AC Electronics
Snell's Law
Conservation of Momentum
Newton's Cradle

Moment of inertia
Optics
Spectroscopy
Spring
Magnetic field
Free fall

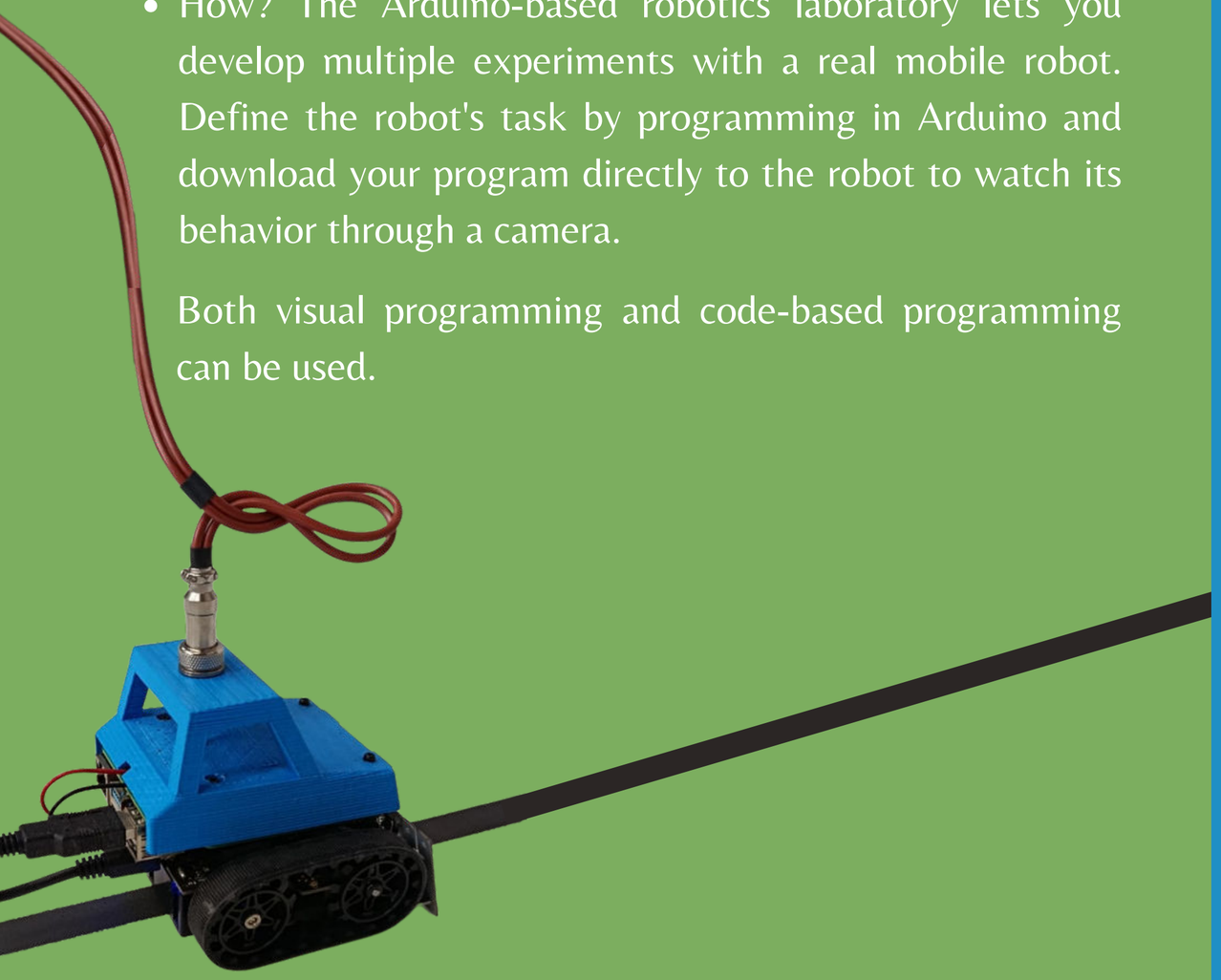


Technology laboratories

ARDUINO ROBOT

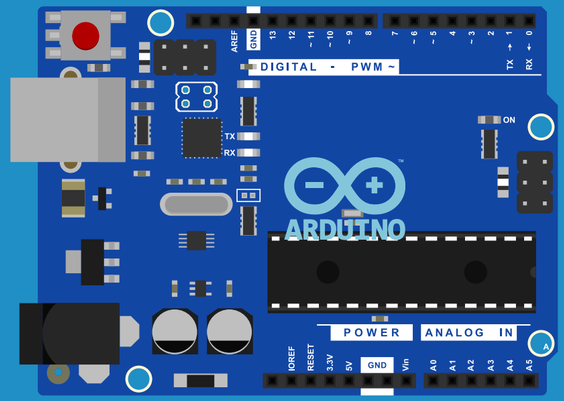
- With this laboratory, you can avoid obstacles, compete on race tracks, find the way out of a maze, and soon even compete against another robot.
- How? The Arduino-based robotics laboratory lets you develop multiple experiments with a real mobile robot. Define the robot's task by programming in Arduino and download your program directly to the robot to watch its behavior through a camera.

  Both visual programming and code-based programming can be used.



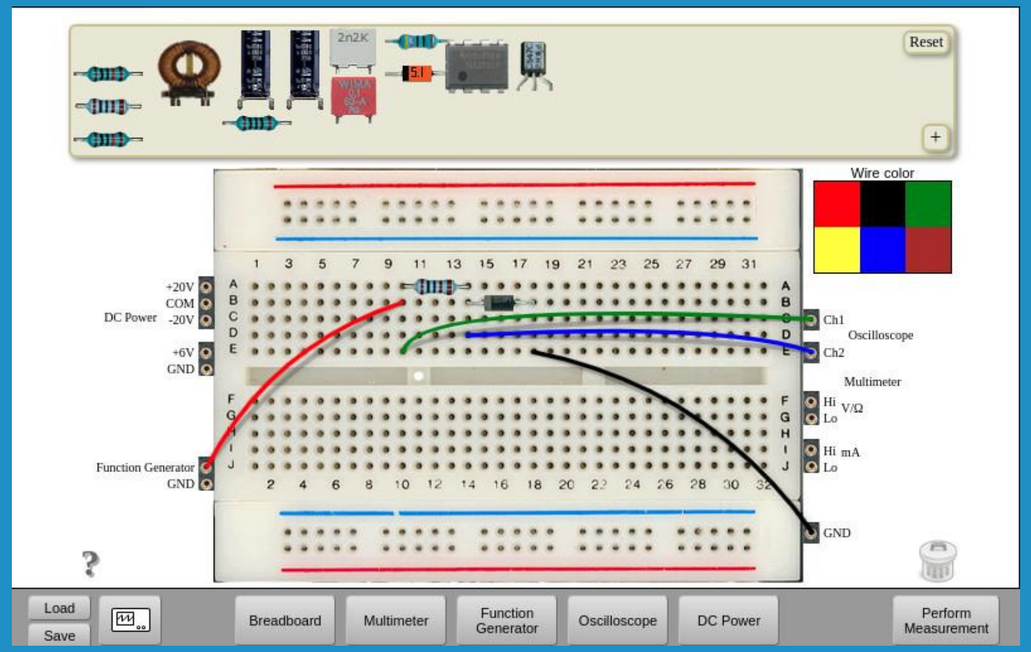
BASIC ARDUINO

- With this laboratory, you can program a real Arduino Uno board.
- It also includes several input and output peripherals, similar to those usually included in typical Arduino starter kits.
- What do these peripherals include?
- LEDs
- Switches
- A small OLED display
- A servo motor...



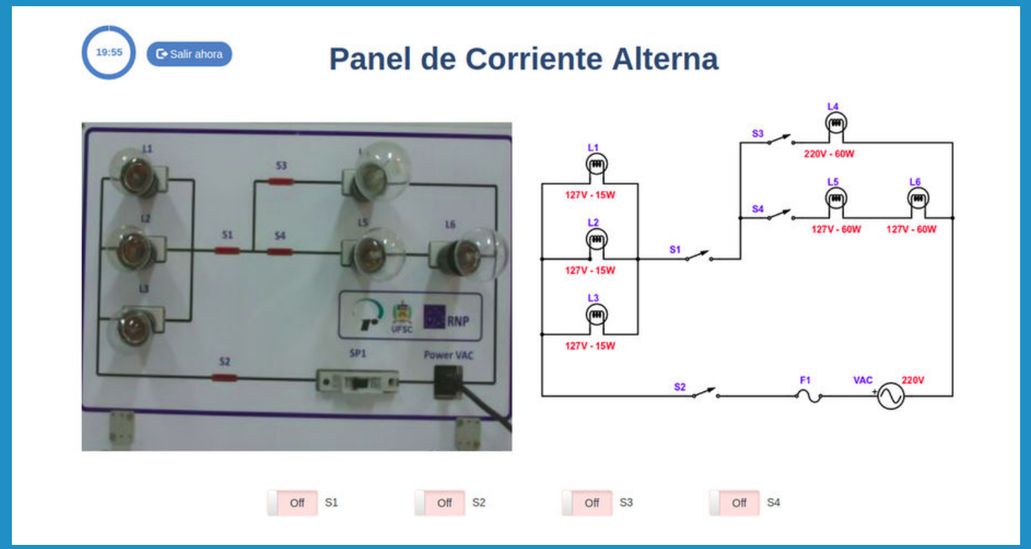
ELECTRONICS

- Remote laboratory for experimenting with the laws and principles that govern analog electronics: resistor combinations, Ohm's Law, Kirchhoff's laws, maximum power transfer, component characterization, and more.
- With this laboratory, you can build real electronic circuits using common components such as resistors, capacitors, inductors, and diodes, and check their behavior with real instruments such as a function generator, oscilloscope, power supply, and multimeter.
- You will use an advanced graphical interface that lets you perform, over the Internet, the same operations you would perform in a traditional laboratory.



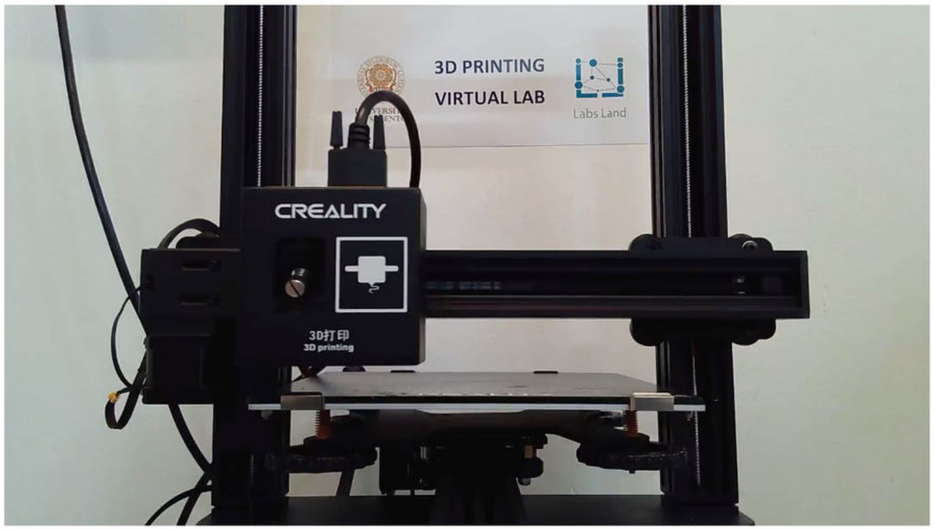
AC ELECTRONICS

- Study how alternating current (AC) works by experimenting with several light bulbs connected in series and/or parallel.
- By opening or closing the switches you choose, you can see the effect on the light intensity of each bulb in the resulting circuit.



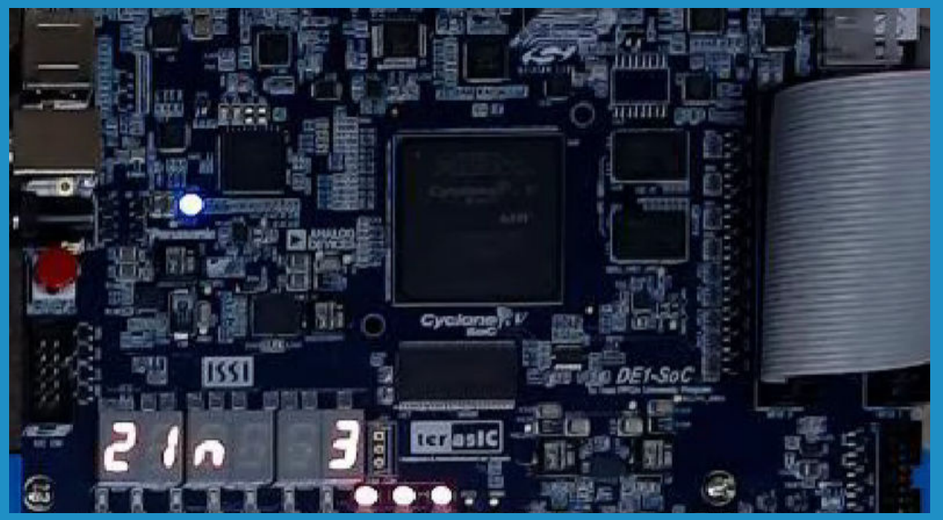
3D PRINTER

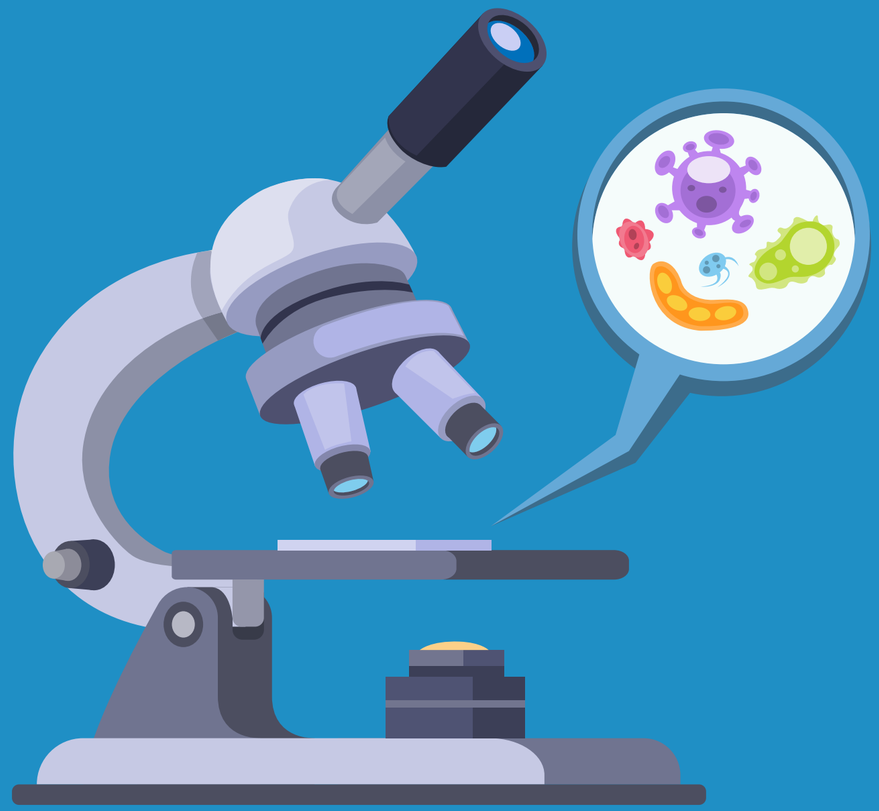
- This laboratory lets you choose among several 3D printing settings.
- You can observe the printing process and the result from different angles.
- You can also control the playback speed.
- Finally, you can download the Ultimaker Cura project file to continue experimenting.



DIGITAL TRAINER

- This laboratory is for you if you are getting started with digital logic, truth tables, and Boolean algebra.
- During the activity, you will see an Intel FPGA implementing a set of simple truth tables.
- You can interact with the FPGA devices to change the system inputs using switches and observe the outputs through LEDs.

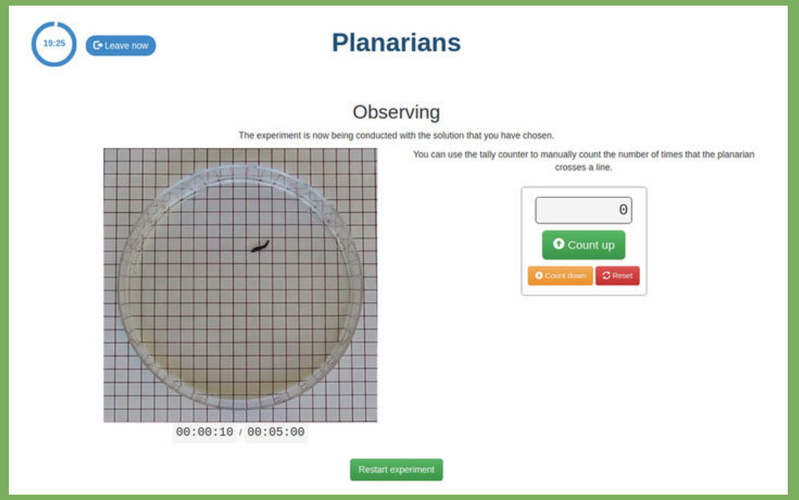




Biology laboratories

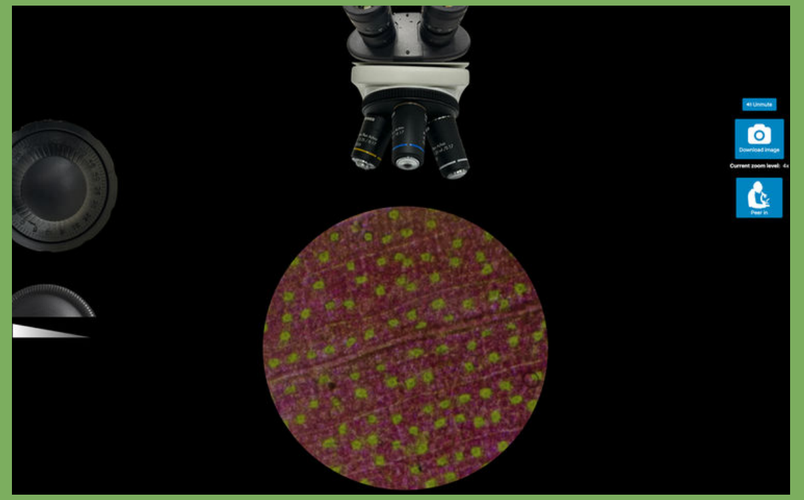
PLANARIANS

- Planarians are a class of flatworms that can be used to study the effect of different substances on the nervous system.
- In this remote laboratory, you can choose the solution in which the worms are placed.
- The solutions are water-based and contain different excitatory or depressant substances at different concentrations.
- In this version of the planarian laboratory, students can use a manual counter to count how many times the planarians cross a line, estimating their activity level.



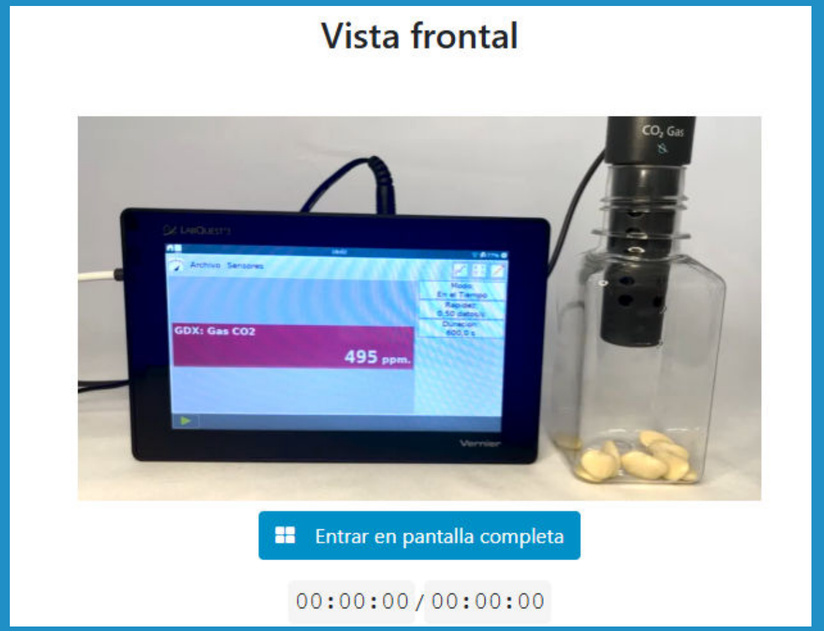
MICROSCOPE

- Through this remote laboratory, you can control the samples being observed under a microscope.
- A 3D microscope model lets you examine all its parts in detail.
- The laboratory lets you analyze six different animal and plant cell samples, with a sample preparation section included.



PLANT TISSUES

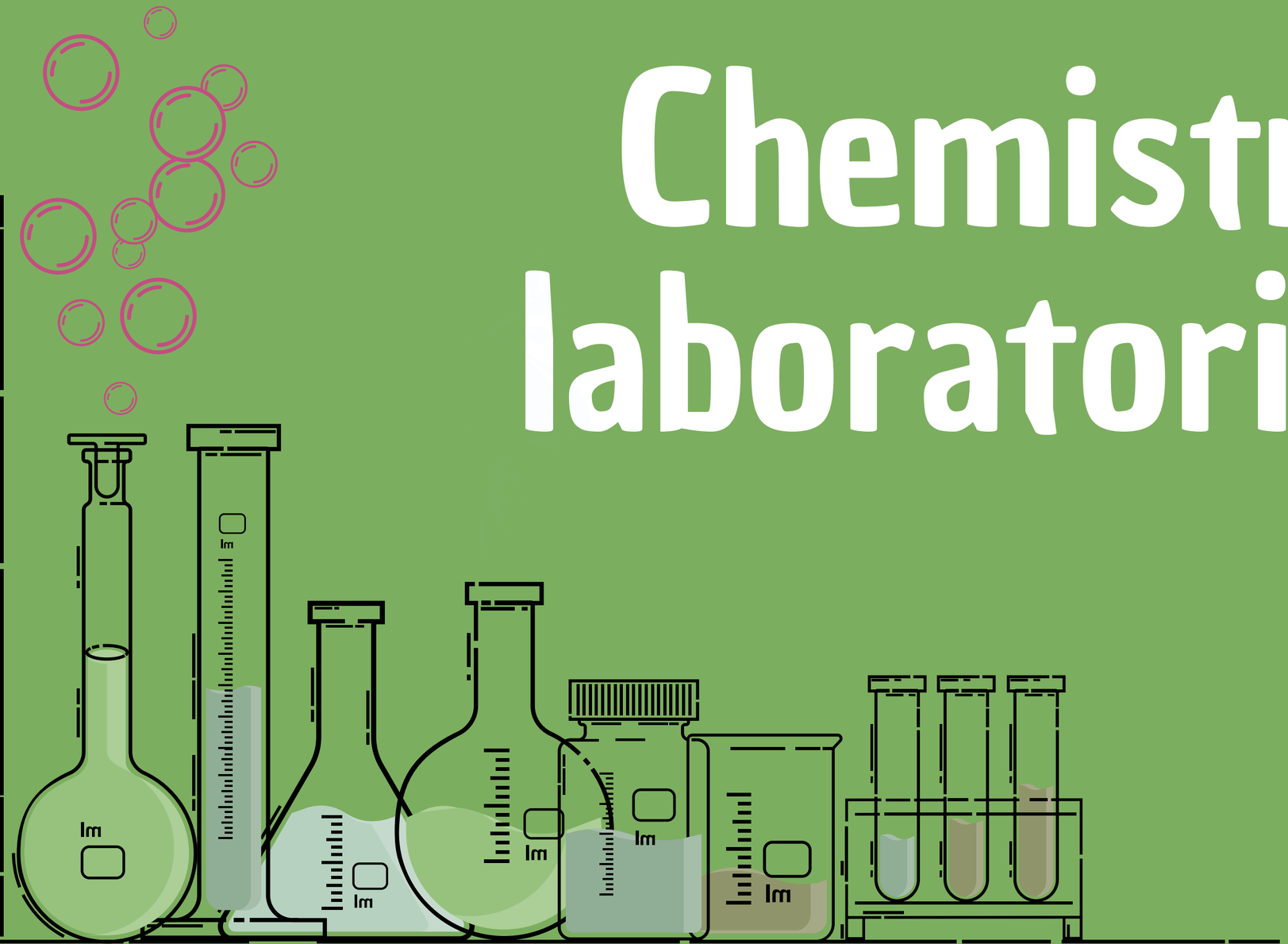
- Through this remote laboratory, you can control the samples being observed under a microscope.
- A 3D microscope model lets you examine all its parts in detail.
- The laboratory lets you analyze different fixed samples from general or agricultural botany.



CELLULAR RESPIRATION

- Through this remote laboratory, you can analyze the process of cellular respiration in seeds in real time.
- Sensors track changes in CO2 and oxygen so students can understand how cells obtain energy.
- It lets you compare seeds under different conditions and analyze real data to understand this essential process in plants.

Chemistry laboratories

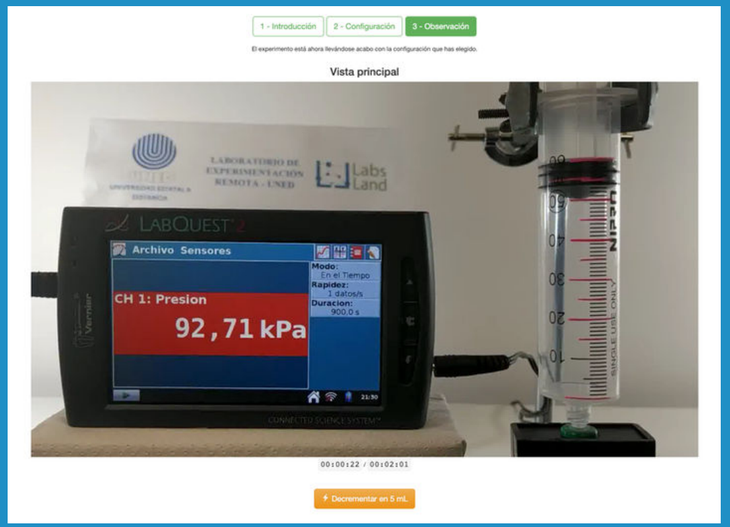


GAY-LUSSAC'S LAW

- Gay-Lussac's law is used to study the behavior of gases and is commonly studied in physics and chemistry.
- It relates gas pressure to temperature while other parameters, such as volume and amount of substance, remain constant.
- In this experiment, students verify that for a given amount of gas, pressure is directly proportional to temperature.

BOYLE'S LAW

- Boyle's law is used to study the behavior of gases and is commonly studied in physics and chemistry.
- It relates gas pressure to volume while other parameters, such as temperature and amount of substance, remain constant.
- In this experiment, students verify that for a given amount of gas, pressure is inversely proportional to volume.
- The experiment is performed at constant room temperature; in the graphical analysis, this behavior is shown as an isotherm.

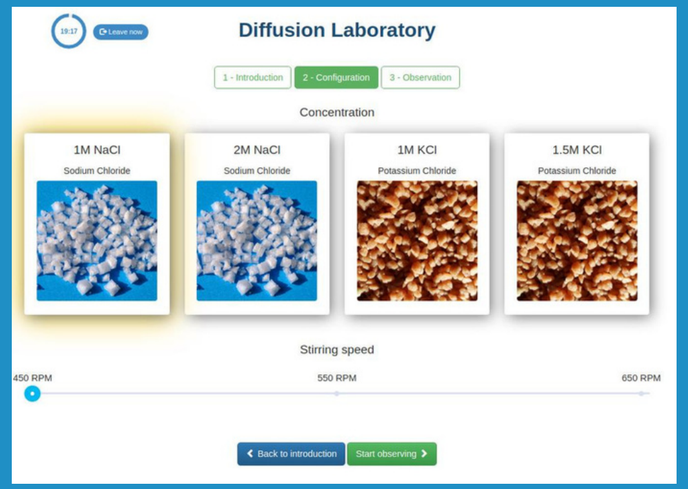


WATER COOLING AND HEATING CURVES

- This laboratory lets you apply both heat and cold to water in different states and observe the effect on temperature.
- When applying heat, you can choose low or high heat; when applying cold, ice is used to cool the water.
- Temperature is monitored with a thermometer.
- It is also possible to control the speed.

DIFFUSION

- Diffusion is an irreversible transport process for molecules and solutes, in which molecules move from an area of high concentration to one of lower concentration. This movement continues unless the temperature reaches absolute zero.
- Diffusion allows a gas or dissolved substance to expand and fill the available volume. Its origin is the natural motion of molecules.



ACID-BASE TITRATION I

- Through this laboratory, you can calculate the concentration of an unknown solution using its volume and the volume and concentration of a standardized titration.
- The first approach is potentiometric: you have access to a digital pH sensor and can use it to determine when the unknown solution has been neutralized.
- The second approach is colorimetric: you can rely on the color change caused by a phenolphthalein indicator, without using a digital pH sensor.

Screen view

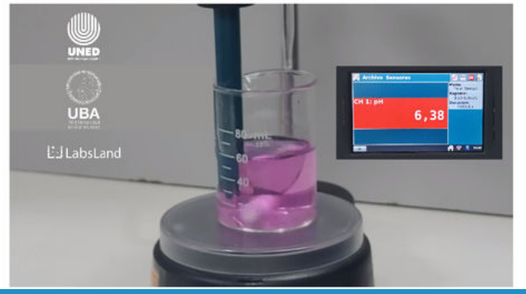
Perspective view

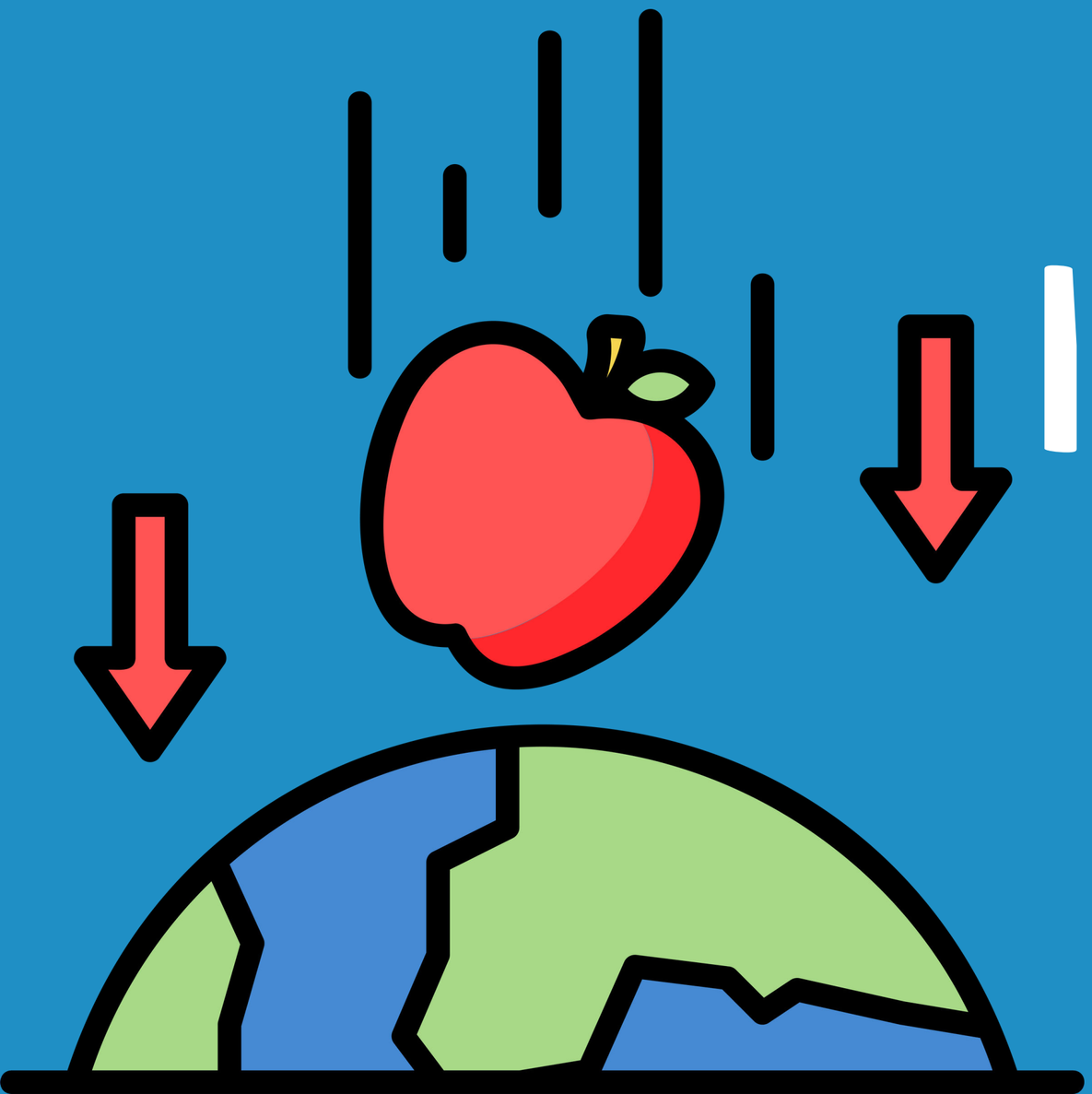
ACID-BASE TITRATION II

- Perform an acid-base titration to determine the concentration of an unknown citric acid solution.
- This technique uses a solution with a known reagent concentration, which is poured over the analyte until it is neutralized. The neutralization point is called the equivalence point.
- A digital pH sensor is always available, and a phenolphthalein indicator has been added to the solution, so both potentiometric and colorimetric approaches can be used.

Front view

Close view





Physics laboratories

RADIOACTIVITY

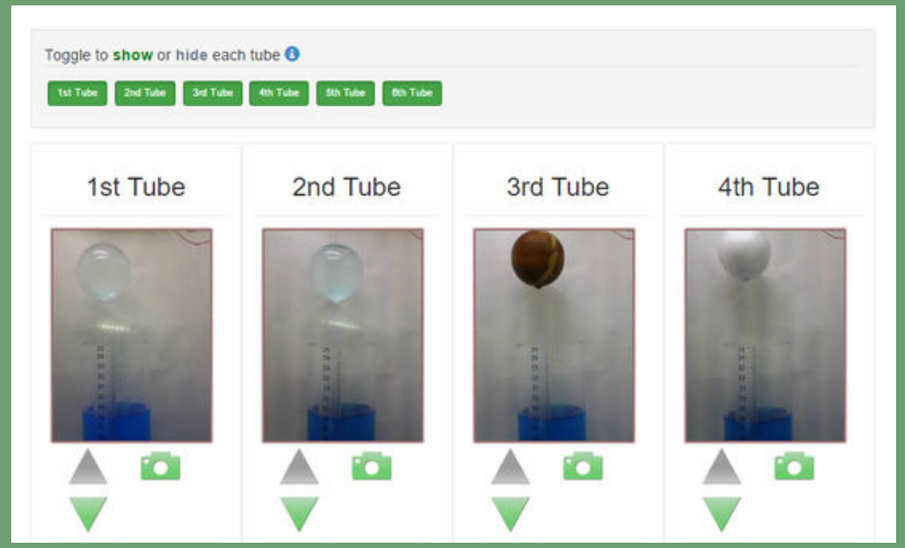
- Check the number of particles emitted by different radioactive materials and detected by a real Geiger counter.
- Change the distance between the sample and the counter, as well as the exposure time.
- You can also place an absorbent material between the sample and the counter and observe its effect on the measurements.

KINEMATICS

- You can experiment with Newton's second law in a system that lets you observe and analyze the behavior of a ball moving along an inclined plane or in free fall.
- The parameters analyzed are time, velocity, and acceleration during the fall.
- The inclination angle is configurable up to 90 degrees, enabling a free-fall scenario.
- Check whether the ball rolls as it moves down the inclined plane or simply slides.

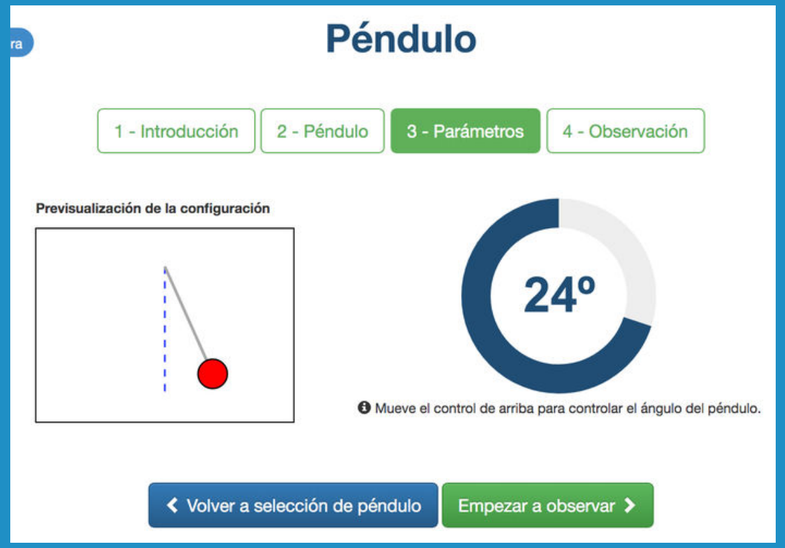
ARCHIMEDES

- Experiment with Archimedes' principle: raise and lower balls of different materials, sizes, and weights, and observe what happens when they are placed in a liquid.
- Do they sink? Do they float? Why? Can you determine their weight? The volume of displaced liquid? The buoyant force?
- Try to answer these questions by observing the experiment and using the values provided by the available sensors.



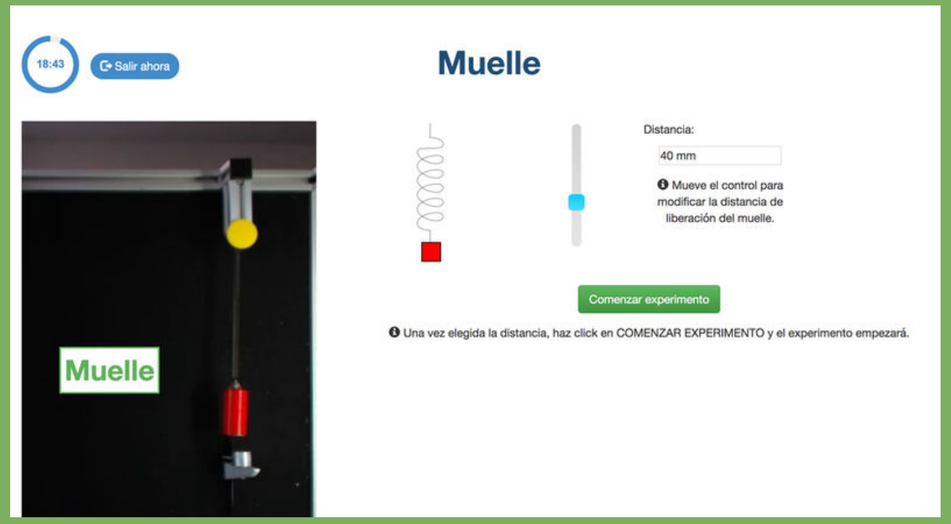
PENDULUM

- With this laboratory, you can control the angle from which a real simple pendulum is released.
- The experiment returns a set of real data, allowing you to analyze the pendulum's behavior based on oscillation time, velocity, oscillation length, and more.
- You can also add weights to the pendulum.



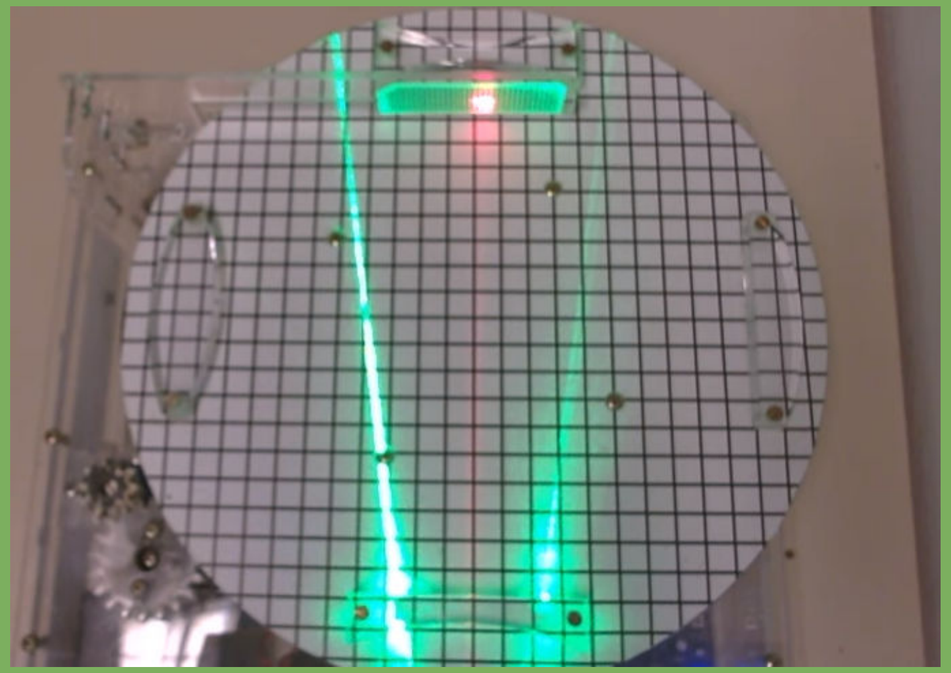
SPRING

- You can control how far a spring is moved, then observe and measure its behavior after it is released.
- This experiment provides a set of real data that can be used to analyze the spring's behavior as a function of distance, time, and other variables.



LENS TYPES

- Through this remote laboratory, you can observe what happens when two light rays pass through a biconvex, biconcave, or convex lens.
- You can control which lens is analyzed at each moment.



BASIC BUOYANCY

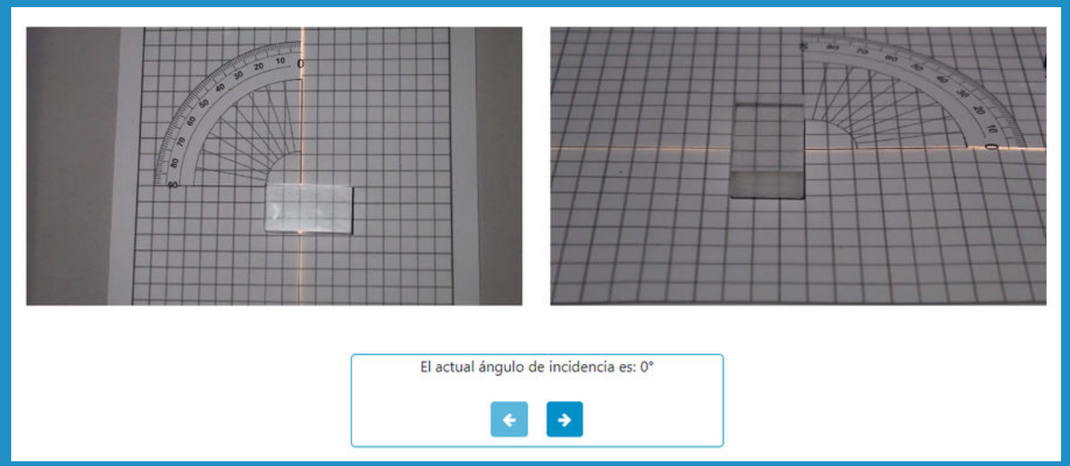
- A suitable laboratory for beginning to explore the concepts of flotation, volume, and density.
- Experiment with several objects of different densities and intuitively understand why they float or sink, without yet moving into complex numerical calculations.

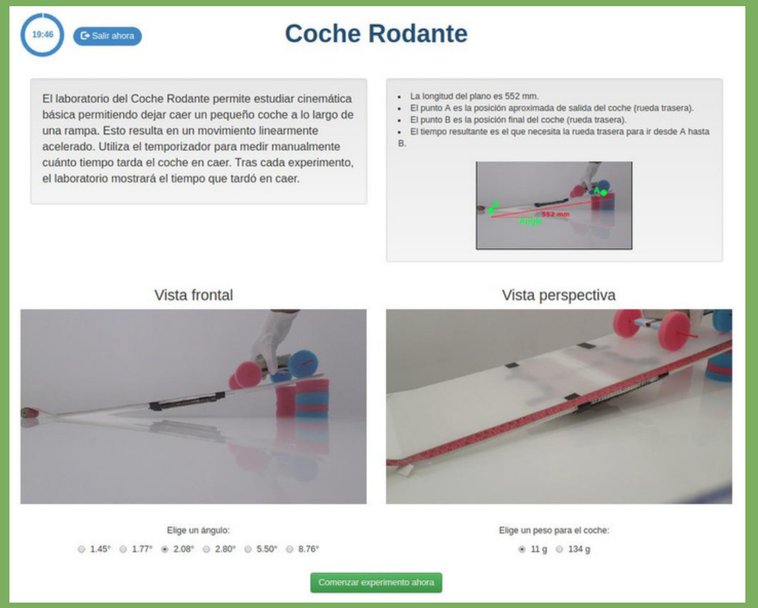
ADVANCED BUOYANCY

- Experiment with buoyancy, Archimedes' principle, and related physical laws.
- Take related measurements, carry out experiments, and begin performing relevant calculations.
- The experiments in this advanced version usually show more data, such as liquid sensor data and object weight sensor data, and the proposed activities involve numerical calculations of varying difficulty.

SNELL'S LAW

- Also known as the Law of Refraction.
- This laboratory lets you study the relationship between angles of incidence and refraction.
- You can experiment with two different lens types, a solid lens or a water-filled lens, to determine their refractive indices.





ROLLING CAR

- This laboratory lets students study basic kinematics by releasing a small car down a ramp.
- This results in linearly accelerated motion.
- A timer can be used to manually measure how long the car takes to descend.
- Alternatively, after each experiment, the laboratory displays the almost exact time it took.

ELECTRONICS

- The electronics laboratory described in the technology laboratories section also applies to this section.
- With this laboratory, you can build real electronic circuits using common components such as resistors, capacitors, inductors, and diodes, and check their behavior with real instruments such as a function generator, oscilloscope, power supply, and multimeter.
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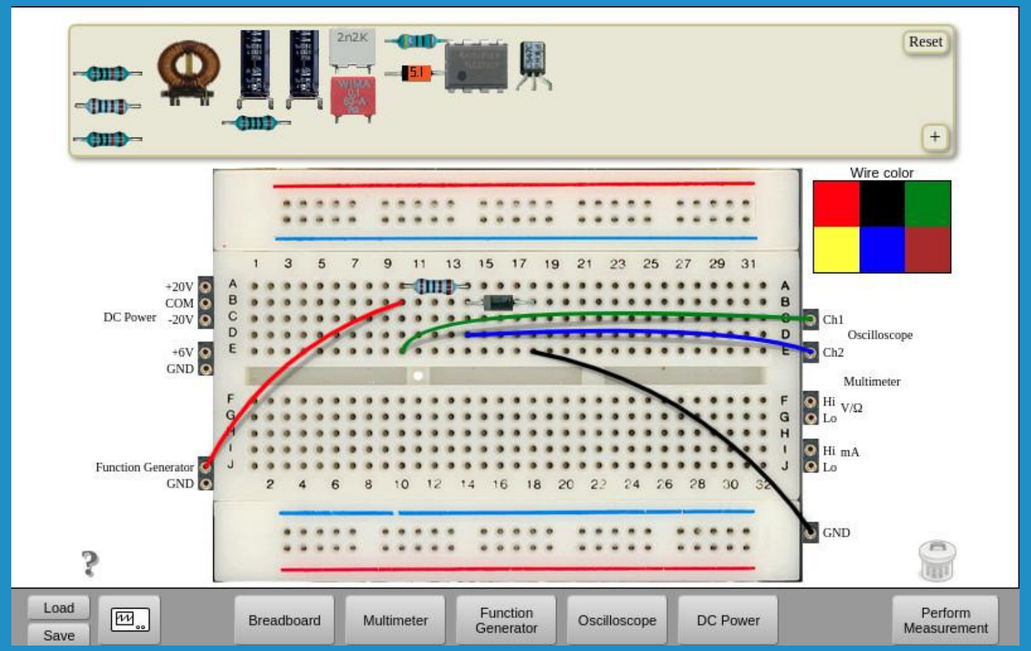
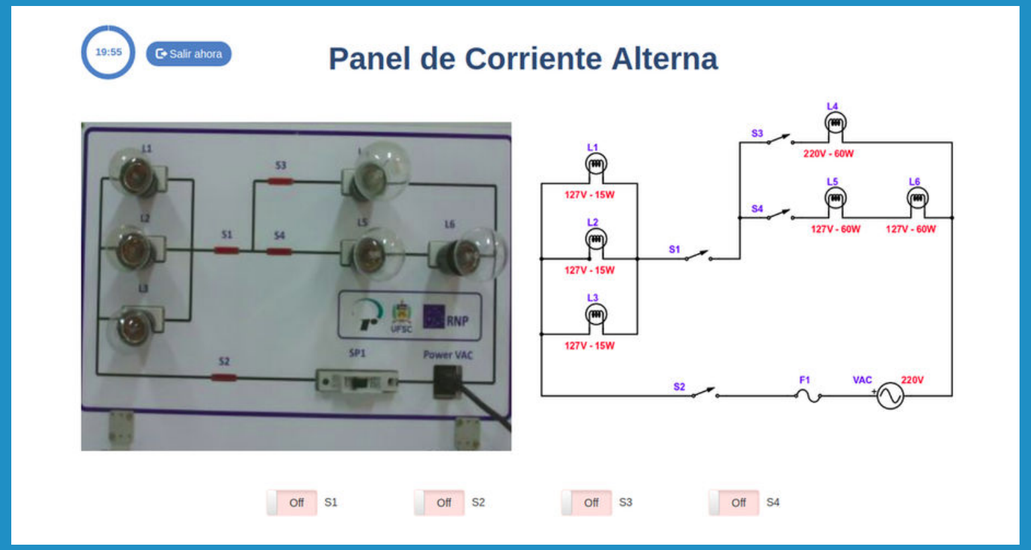


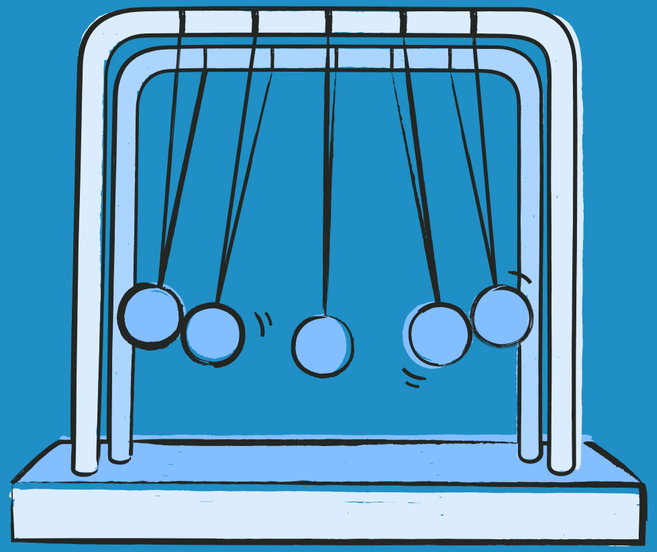
AC ELECTRONICS

- The AC electronics laboratory described in the technology laboratories section also applies to this section.
- Study how alternating current (AC) works by experimenting with several light bulbs connected in series and/or parallel.

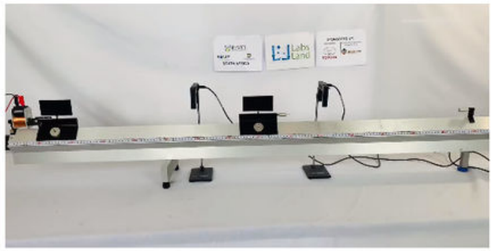


NEWTON'S CRADLE

- Newton's Cradle is a device that demonstrates the laws of conservation of momentum and energy using a series of oscillating spheres.



Vista frontal



Enter full screen

Vista Perspectiva

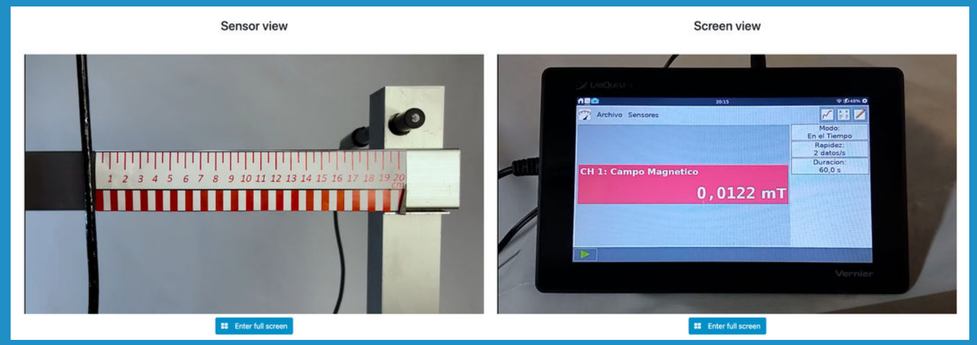
Enter full screen

CONSERVATION OF MOMENTUM

- Through this laboratory, you can make two carts collide in an elastic or inelastic collision while varying experimental variables such as cart mass, from 50 g to 150 g.
- You can then experimentally test whether total momentum changes after the collision.

MAGNETIC FIELD

- This laboratory lets students experiment with a magnetic field.
- You can create a magnetic field and control the intensity of the current used to generate it.
- You can vary the distance from the probe to the magnetic field to see how distance affects the measurement.



FREE FALL

- This laboratory offers a way to perform experiments on gravity and conservation of energy.
- You can choose from a variety of objects with different masses and release them using an electric switch.
- A receiving device measures the time the object takes to fall, allowing you to calculate gravity experimentally and perform other experiments involving objects in free fall.

MOMENT OF INERTIA

- Through this remote laboratory, you can study how mass distribution affects rotational motion.
- You can select and compare different rigid bodies, such as rods and disks, with different mass configurations and pivot points.
- It lets you observe how the same torque produces different responses depending on geometry and mass distribution, helping students understand moment of inertia and its role in rotational dynamics.

THERMAL EXPANSION

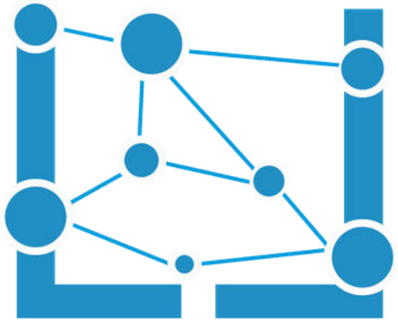
- In this remote laboratory, you can apply heat to different materials, such as copper, brass, and aluminum, to observe their thermal expansion in real time.
- You can compare how each material responds to rising temperature and analyze the relationship between physical properties and thermal expansion.

SPECTROSCOPY

- In this remote laboratory, you can analyze the X-ray spectrum produced by a tube with a gold anode and detect its radiation using real instrumentation.
- You can observe bremsstrahlung radiation and the characteristic lines of gold, exploring basic principles of spectroscopy and radiological instrumentation applied in industrial and medical contexts.

SPRING

- In this remote laboratory, you can compress a spring and release it to observe its motion in real time.
- You will obtain real data to analyze the spring's behavior according to distance, time, and other variables, applying principles of dynamics and elastic energy.



LabsLand

Contact us!

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