


MiLABEx™ User Manual

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Introduction

MiLABEx™ is a powerful app that collects, displays, and analyzes experiment data. MiLABEx™ should be paired with the einstein™ Tablet or the einstein™ LabMateII, which allows you to transform any PC and Android/iOS device into a holistic digital lab and works with unique brand sensors that collect data such as temperature, humidity, light, and many more.

Designed for K-12 educators, MiLABEx™ offers comprehensive features and capabilities for a unique learning and teaching experience:

- Create and run experiments
- Collect and display data in real-time
- View data in various formats, including graphs, tables, and meters
- Create and share workbooks with experiments and enriched learning
- Have your own weather station and collect data for a long period of time
- Export data

Getting Started

MiLABEx™ can be used on the einstein™ Tablet or any PC or Android/iOS device when paired with the einstein™ LabMate. If you have the einstein™ Tablet, the MiLABEx™ app will already be installed. Simply tap the MiLABEx™ icon to start: 

For any other device, the MiLABEx™ app needs to be installed. Please see the instructions below for your device.

Installation on an iOS Device

To download MiLABEx™, [tap here](#) from your iOS device or follow the instructions below.

1. Tap the App Store icon on your device
2. Search for MiLABEx
3. Tap “Get” to start the download

Once downloaded and installed, the MiLABEx™ icon  will appear on your home screen. Tap it to open the application.

Installation on an Android Device

To download MiLABEx™, [tap here](#) on your Android device or follow the instructions below.


1. Tap the Play Store icon on your device
2. Search for MiLABEx
3. Tap “Install” to start the download

Once downloaded and installed, the MiLABEx™ icon will appear on your home screen. Tap it to open the application.

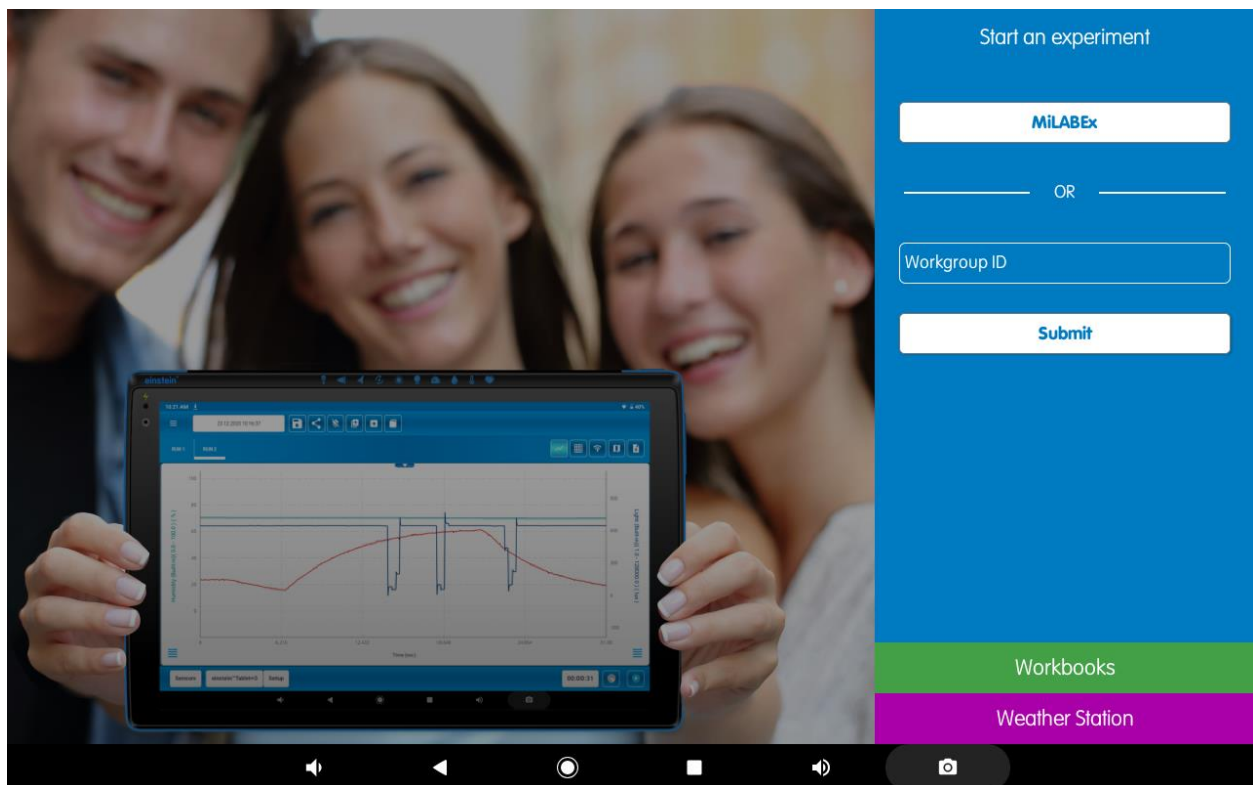
Installation on a PC

To download the MiLABEx™ software, visit the [Einstein World website](#).

Navigating the MiLABEx™ App Home Screen

Once installed, the MiLABEx™ app will appear with the following the icon  on your device:

Simply tap it to open the app. If you can't find the app, tap the App Store icon (for iOS) or the Play Store icon (for Android) and search for MiLABEx. If the application is already installed on your device, you will be able to tap the Open button. If the button says “**Get**” or “**Install**”, follow the installation instructions to install the app on your device. The MiLABEx™ home screen is the main screen to access all the different areas within the app:



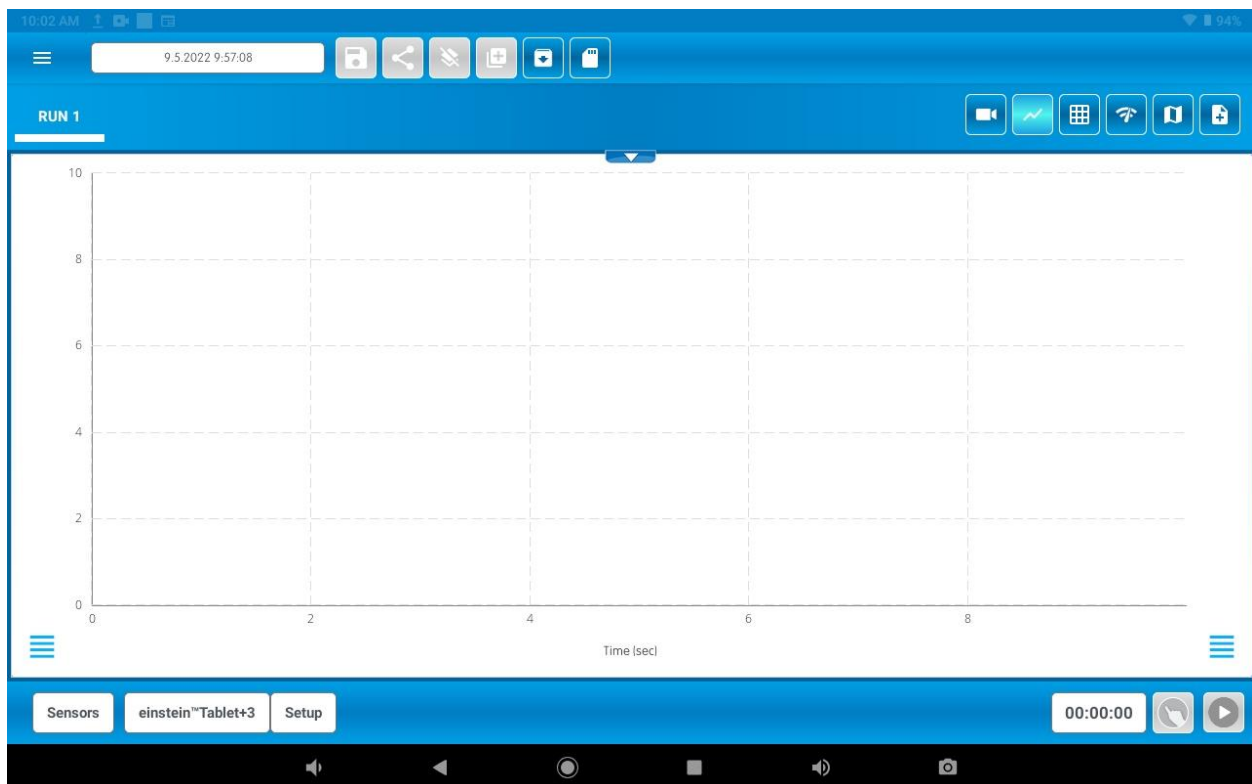
- **Start an experiment –**
 - Tap **MiLABEx** to start a new experiment and to open a saved experiment. Here you can also configure your preferences, access the version information and user guide
 - **Workgroups** – The Workgroup section allows you to enter a workgroup ID and view all of the workbooks shared under that ID.

- **Workbooks** – Log into your einstein™ account and access the Workbooks section, where you can create Workbooks and Workgroups, view your Workbooks, and view public Workbooks in the einstein™ store.
- **Weather station** - Opens the “Weather Station” window which will be described in [the Weather Station chapter](#).

Navigating the MiLABEx™ Experiment Main Screen

MiLABEx™ allows you to create and run new experiments, run saved experiments, and view and analyze your data visually in various display formats.

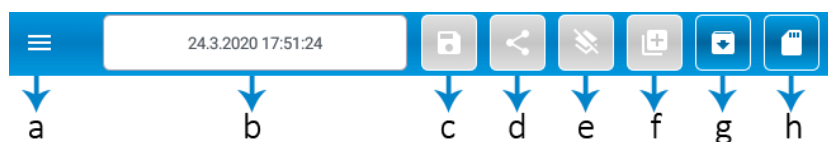
By default, MiLABEx™ opens on a new experiment screen:



The MiLABEx™ screen includes three main parts:


Top Navigation Bar

The navigation bar at the top allows you to carry out actions on an experiment. Buttons that are enabled are blue, while actions that are not available are gray.



- a. **Menu:** Tap to open the MiLABEx™ menu to [edit unit and language preferences](#), access the user guide, and view the app version information.
- b. **Experiment Name:** Tap to customize the name of the experiment. By default, new experiments will have an automatically generated name based on the time and date the experiment was started. In addition, you can name an experiment before running your experiment.
- c. **Save Experiment:** MiLABEx saves the experiments automatically. In case there were other changes it is possible to save the changes but tapping the save icon. This can only be done after an experiment has run and contains data. In the above image, this button is gray, which means that the no experiment was done and therefore there is nothing to be saved.
- d. **Share Experiment:** This action is enabled only when an experiment contains data. Tap the icon to choose which kind of file you want to share (.mib or .csv), and choose how you'd like to share the experiment. If the user decides to share an .mib file, the recipient must have the MiLABEx™ application (Android, iOS or Desktop) in order to view the experiment.
- e. **Delete Experiment:** This action is enabled only when an experiment contains data. To delete the data without saving, tap the delete icon. If you wish to save first, select "Save and clear".
- f. **New Experiment:** Tap to create a new experiment. This option is not enabled if a new and empty experiment is already open.
- g. **Select Saved Experiment from App:** Select and load an experiment from the "Saved Experiments" in the application. When the app is uninstalled, it will also delete these experiments.
- h. **Select Experiment from Device:** Select and load an experiment saved on the device's internal storage folders. This allows you to load experiments sent to you by another user, saved on your device.

Experiment Screen

The experiment screen is the large area in the center. It contains the main screen view and a few menus. The white arrow at the top of the main screen () allows you to show or hide the experiment menu.

The experiment menu allows you to view the different experiment runs, and display your data in additional formats:



- a. **Runs:** Every experiment can have multiple runs. The number of runs is limited by the device's memory and CPU capacity. To view a run, simply tap the tab with the run number you'd like to see
- b. **Video Recording:** It is possible to record video during an experiment. Tap on the video icon and a video window will open. The recording starts when you start running the experiment.
Please mind :The sound sensor cannot work with the video recording.
- c. **Graph:** Each experiment run is shown in graph format by default. You'll see that the graph icon is automatically selected. Multiple display formats can be chosen, but one must always be selected. To view a different format in the main view, select it and then deselect the graph icon.
- d. **Table view:** Tapping on the table view will open a table with the measurements that were collected during the experiment.
- e. **Meter view:** The meter view includes 4 different meters (See [Meter View](#)).
- f. **Map view:** Using the GPS of the device, a map with your location will appear.
- g. **Note's view:** Add notes by tapping the icon and the text area. You can then either type a note on your keyboard or use Google Voice-to-Text on your keyboard to add a note with your microphone.

Bottom Experiment Setup Bar

The bar at the bottom of the screen allows you to set up experiments.



- a. **Sensors:** Opens the list of all connected sensors, both external and built in. Please mind that there are devices (desktop, tablet or mobile) with built in sensors like Microphone or Accelerometer which MiLABEx may identify.

When using einstein™Tablet+3 there are additional built-in logger and sensors which allow you to connect external sensors directly to the tablet. When using an iOS/Android device or PC LabMate is required to connect external sensors. Tablet+3 and LabMate enable connection to about 60 different sensors.

- b. **Connect a device(LabMate) :** Opens the list of devices you can connect to the app via Bluetooth. Once connected, the device name will appear in the bottom bar instead of “Connect a device”. For example, if you are using the Einstein™ Tablet, the button will say einstein™Tablet+3 like in the above image.

Tapping the button will open the list of devices that can be connected as you can see in the picture below.



There are three types of devices that can be connected: Internal, Bluetooth, and BLE (Bluetooth low energy). When using the einstein™ tablet, the tablet name will appear under the “Internal Logger” menu. When using any other tablet, only Bluetooth and BLE menus will be available.

- c. **Setup:** Tap to set up an experiment. If an experiment is already opened, you can tap the button to edit its existing settings.

- d. **Duration:** Displays the experiment's duration in real time. When the experiment is running, the timer will run.
- e. **Prediction tool:** Allows you to use the prediction tool before running an experiment. Please find further information in [Prediction Chapter](#)
- f. **Run/Stop** button: Tap to run or stop the experiment.

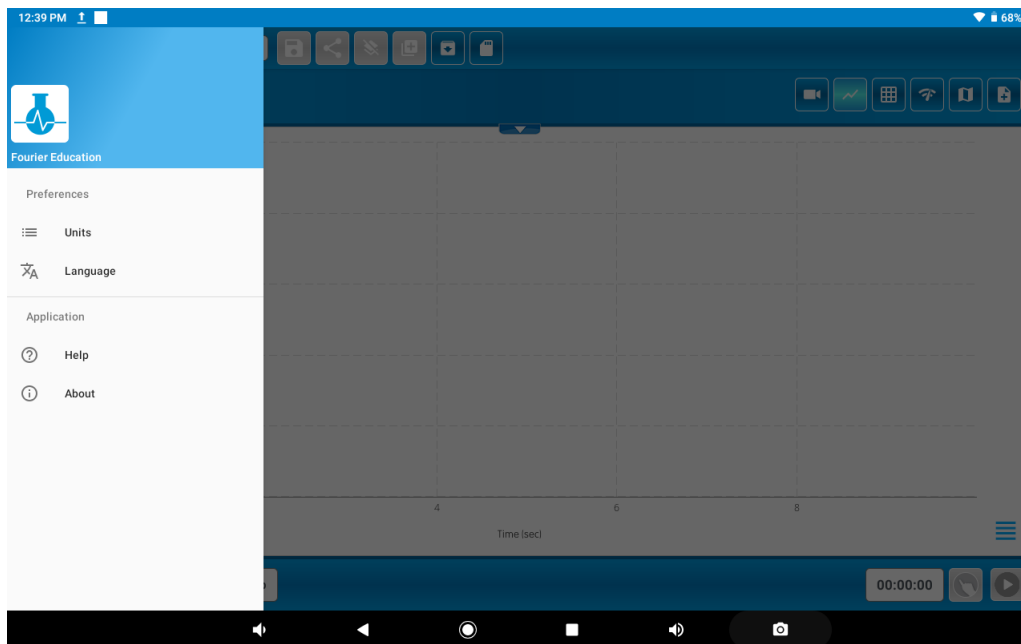
Note: The **Run** button will change depending on the sampling type you select for your experiment.

Menu

Once MiLABEx™ is installed, you can set it up according to your preferences, to open a user guide and to find information about the version.

Open the MiLABEx™ app and tap the **MiLABEx** button.

Tap the three menu lines at the top left of the screen



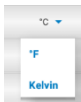
Preferences -Unit Settings

To configure your unit preferences, tap **Units**.





This will open a menu of all the different measurements you can select units for.

← Measurements ✓ ✕	
Acceleration	g ▾
Current	A ▾
Temperature	°C ▾
Pressure	kPa ▾
Distance	m ▾
Weight	kg ▾
Magnetic Induction	mT ▾
Concentration	ppm ▾
Speed	m/s ▾
Volume	ml ▾
Conductivity	mS/cm ▾
Electrostatic Charge	μC ▾
Flowrate	L/min ▾



To change a measurement’s units, tap the small blue arrow and select a unit:

When you’re done, tap the white checkmark  at the top to confirm your selection or the arrow  to go back.

Preferences - Language

To configure your language preferences, go the menu and then tap **Language**.

Preferences



☰ Units

🌐 Language

Select the desired language by tapping it. A gray checkmark will appear next to the selected language.


Please mind: Changing the language here will only change the language in MiLABEx™.



Tap the white checkmark  at the top to confirm your selection or the arrow  to go back.



Don't see your language here? Contact our developers and let them know what language you'd like us to add: support@einsteinworld.com

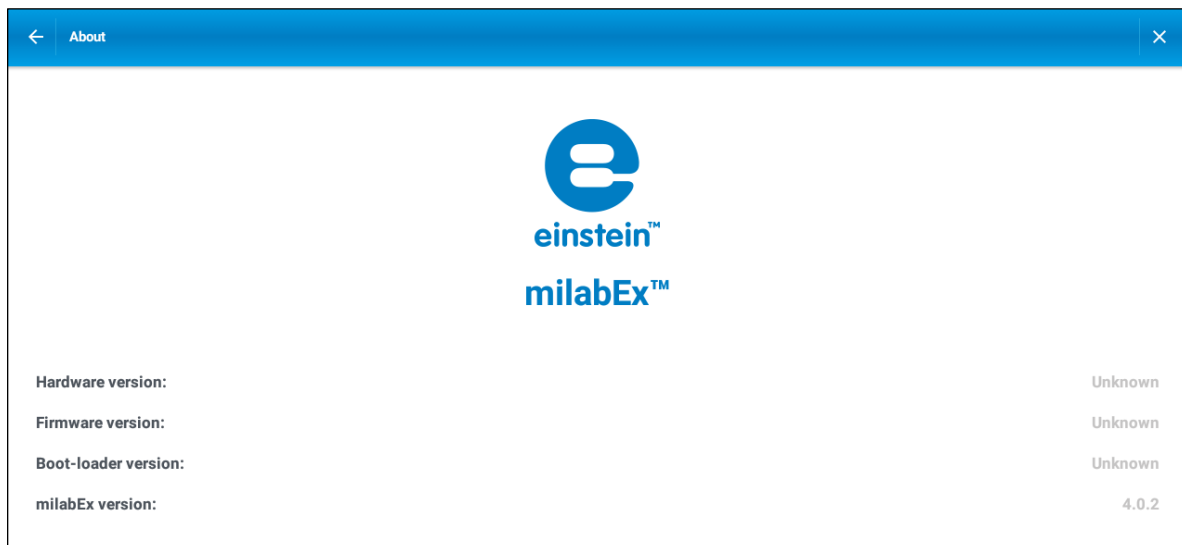
Help

Access the user guide by tapping the main menu in MiLABEx™, and then tapping Help:  **Help** or by visiting our website: <https://einsteinworld.com/manuals-2/>

About - App Version Information

App version information may be required when contacting technical support. To view your app version information:

1. Tap the MiLABEx™ button on the main MiLABEx™ home screen
2. Tap the menu icon at the top left of the screen 
3. Tap About  **About**



Creating and Running Experiments

To start an experiment, there are few things that need to be set up:

First, make sure that a device is connected to the app. Click **Connect a device** at the bottom experiment menu bar and select the relevant einstein™ device:

Connect a device


If you are using the einstein™Tablet, it will automatically be selected. If you are using any other device, connect and select the LabMate device.

Once a device is connected, the 'Connect a device' button will change and show the device name, for example:

einstein™Tablet+3

Second, set up sensors as described [below](#).

You can also set up and change parameters as described in [Setting Up Parameters for Your Experiment](#). Please note that it has a default setup, and you don't have to set it up all the time.

Once an experiment runs, it is not possible to change the unit format and language. Before running an experiment, choose your preferences by tapping the top menu .

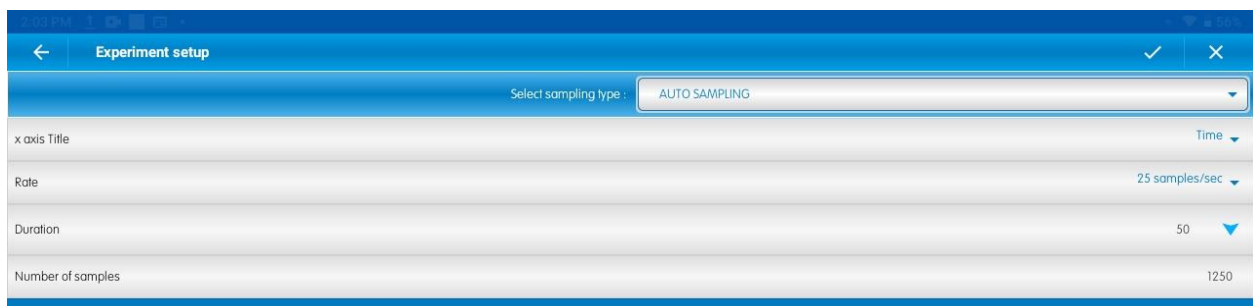
Setting Up Parameters for Your Experiment


To start setting up the parameters for your experiment, click 'Setup' at the bottom menu:





The **Setup** menu allows you to control:

- The sampling type of the experiment
- X-axis
- Sample rate
- Duration
- Number of samples



When making any changes to the experiment setup parameters, tap the white checkmark at the top to confirm and save your changes: 

To cancel, tap the X icon or the arrow icon, which will send you back to the main experiment screen: 
or 

Available Sensors

The LabMate has eight built-in sensors:

- Heart rate 40-240 bpm
- Light: 0-128 klux
- UVI: 0-11
- Temperature: -30°C to 50°C
- Humidity: 0-100%
- Heat Index: 0-100°C
- Dew Point: 0-100°C
- Barometric pressure: 260 to 1260 hPa

Additionally, MiLABEx™ will detect and use any sensors built-in to the device you're using, such as camera, GPS, heart rate sensor, etc.

The einstein™ tablet has 13 built-in sensors:

- Humidity: 0-100%
- Heat Index: 0-100°C
- Dew Point: 0-100°C
- Temperature: -30°C to 50°C
- Barometric pressure: 260 to 1260 mbar
- UVI: 0-11
- Light: 1-128,000 lux
- Heart Rate: 40-240 bpm.

There are two heart rate parameters available, which measure the heart rate in volts or BPM.

The Voltage enables the user to follow hearts extraction and contraction. To measure heart rate, the einstein™ tablet does not require an external device. Simply place your finger over the back

camera lens, which is placed near the flashlight, and not the front camera. The tablet will start to measure your heart rate automatically once you've selected the heart rate sensor.

- Microphone: Frequency - 35- 10000 Hz, Range -2.5V
- Sound: 40.0-110.0 dB
- Accelerometer: Includes three options for the experiment graph (xyz). You can select which axis to measure the parameter.
- GPS: Includes six options - Latitude, Longitude, Altitude, Velocity, Bearing, Time. You can view your location on the map in the main experiment screen, along with additional measurable parameters from point A to B.
- Video Sensor (using the back camera)

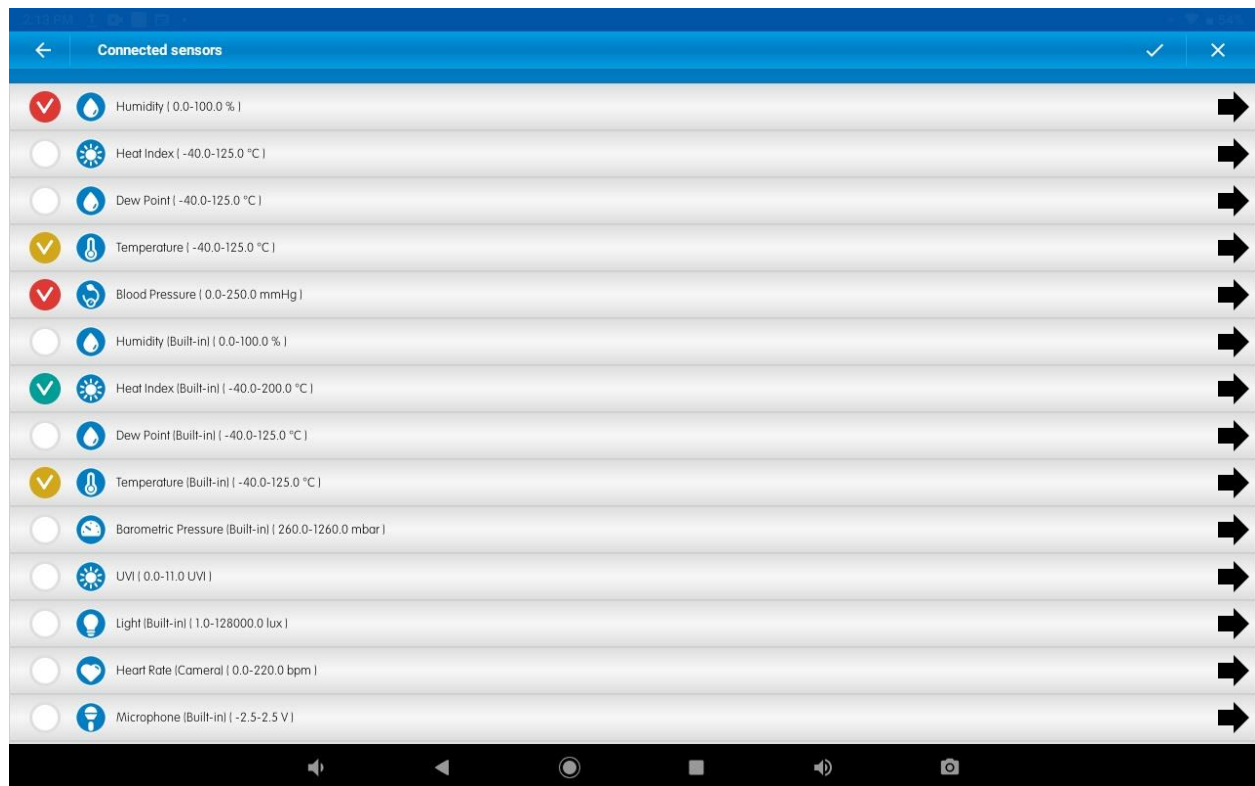
Sensor Setup

The einstein™ Tablet and LabMate are equipped with built-in sensors and can connect to over 60 different external einstein™ sensors compatible with MiLABEx™.

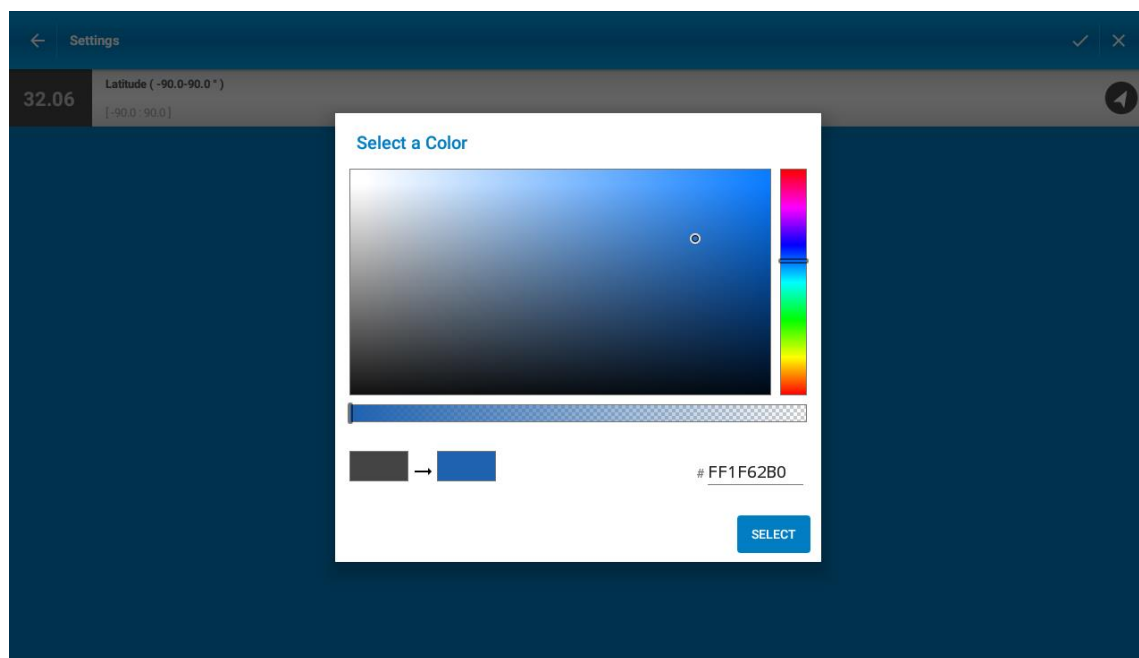
Tap the **Sensors** button at the bottom menu of the MiLABEx™ interface:



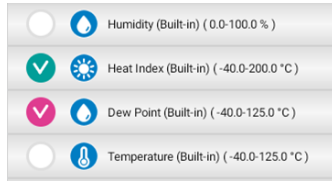
This allows you to see all the internal and external sensors of your device. Internal sensors are marked with round brackets and the words “Built-in”, as you can see in the image below.



Each sensor can be assigned a color as its plotline in the experiment graphs. Tap a sensor in the list, and then tap the sensor's icon on the right to choose its color.



When an external sensor is connected to the device, the app will automatically assume you want to use it in your experiment and will select it as “in use” with a colored check mark indicating it will be measured.

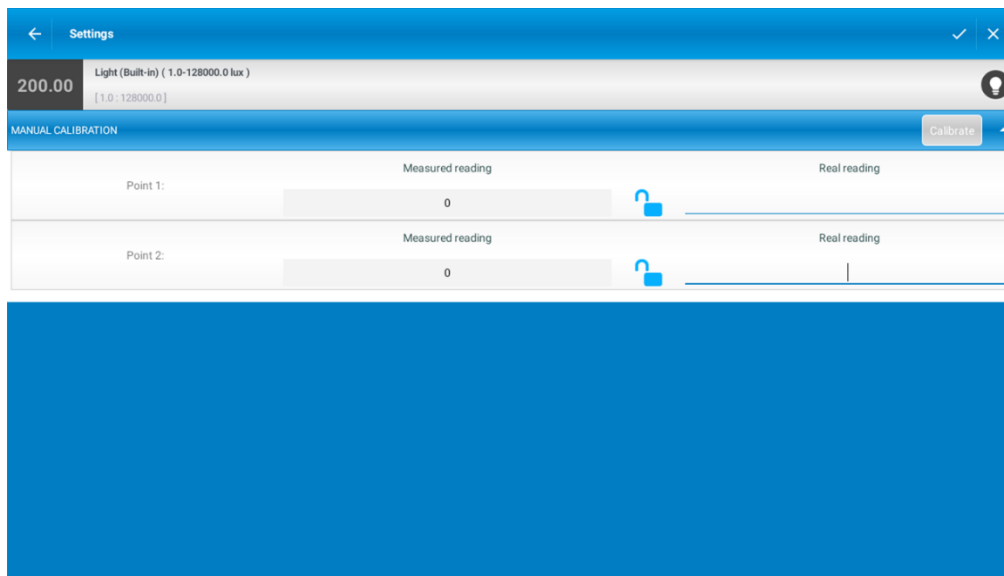


When selecting a sensor, confirm your selection by tapping the checkmark at the top of the screen.

Sensor Calibration

Some external sensors need calibration from time to time. To calibrate the sensor, please connect it to the Logger and it will appear at the top of the ‘Connected Sensors’ list.

Tap on the sensor and it will show the relevant calibration type of the sensor for example:



- From left to right, the first row displays the current reading value from the sensor (this simply shows the reading without saving the data), the name of the sensor and its range, and an icon. The icon will be in the color you selected for the sensor. The icon itself does not change.

- The second row shows if the sensor supports zero calibration. Specific sensors can be set to zero calibration, such as voltage.
- The third row will be displayed if the sensor supports range selection. If the sensor supports either one-point or two-point calibration, the fourth row will display a calibration panel. Manual calibration can be set up varying based on the sensors used for the experiment. For example, measurement of carbon dioxide in the air can be set at one parameter of measurement, whereas measurement of dissolved oxygen is set at two parameters of measurement.

The screenshot shows a 'MANUAL CALIBRATION' screen with a blue header. In the top right corner of the header is a 'Calibrate' button. Below the header, there are two rows for calibration points. Each row has a label on the left ('Point 1:' and 'Point 2:'), a 'Measured Reading' field in the center containing the value '0.11', a blue lock icon to the right of the field, and a 'Real Reading' field on the far right. The 'Real Reading' field for Point 2 has a vertical line cursor inside it.

MiLABEx™ supports 3 types of manual calibrations:

- **One-Point Calibration:** To set the calibration, tap the line below the title “Real Reading”, enter the known value, and tap the lock icon. When doing this, measure something with a known value (e.g., atmospheric oxygen = 21.9%). Once completed, the ‘Calibrate’ button at the top will turn green. Tap it to complete the manual calibration.
- **Two-Point Calibration:** To set the calibration, start measuring one point, tap the line below the title “Real Reading”, enter the known value for this point, and tap the lock icon (e.g pH4. And then repeat with the measure of the second point (e.g pH7) and tap the lock icon. Once completed, tap the ‘Calibrate’ button at the top will turn green to complete the manual calibration.
- **Set Zero Calibration:** Some sensors can use set zero calibration in addition to either One Point or Two-Point Calibration. Tap the sensor to view its calibration options and tap the toggle button for **Set Zero** to turn it on/off.

Additional calibrations are available for specific sensors:


- **Wheel Calibration:** This option can be found in the rotary motion sensor. There are three different diameters to the wheels. Select the correct diameter of the wheel relevant to your experiment before starting.

- **Drop Counter Calibration:** Used for measuring drops and the volume of liquid drop accumulation in experiments. For example, when measuring the total fluid that drops from a bottle, the user must calibrate both the number of drops to measure and the volume of each drop in order for the experiment to evaluate it accurately. This is important due to liquids varying in drop rate, weight, and volume (for example, water vs oil).
- **Smart Pulley Calibration:** This is relevant when a wheel is used for physics experiments with a photogate device. You must calibrate the size for the wheel being used.

Sampling Type

There are four sampling types: Auto Sampling, Manual Sampling, Triggered Sampling and Event-Based Time Measuring. By default, **Auto Sampling** will be selected. To change it, tap the blue arrow and select a sampling type from the dropdown menu.

The screenshot shows the 'Experiment setup' interface. At the top, there's a blue header with a back arrow, the title 'Experiment setup', and check/cancel icons. Below the header, a dropdown menu is open for 'Select sampling type', showing four options: 'AUTO SAMPLING' (selected), 'Manual Sampling', 'Triggered Sampling', and 'Event Based Time Measuring'. To the left of the dropdown, there are input fields for 'x axis Title', 'Rate', 'Duration' (set to 50), and 'Number of samples' (set to 1250).

- **Auto Sampling:** Allows you to run any experiment using default settings or change the setting according to your needs.
- **Manual Sampling:** For some experiments, you will want to manually determine when to take a measurement. Ideal for experiments in which you have various light sources: for example, if you are measuring light and want to see the parameters of each light source individually mapped on the graph. When selected, you can tap the pen icon on the graph () to record the light measured by the sensor at that precise moment. This is useful if you are measuring light from multiple lamps, as it records data accurately for every lamp generating light.
- **Triggered Sampling:** Sometimes you will only want to start an experiment when a certain condition is met, for example when a solution reaches a certain temperature. This is called a trigger. When setting up triggered sampling, select your triggered parameter to ensure the relevant measurements appear on your graph. For example, when measuring light, select the

number value and whether the device should collect data below or above that numerical value.

Triggered data based on the values you define will then appear on the graph.

- **Event-Based Time Measuring:** This sampling type is for physics experiments and is used with the photogate sensor.

Duration

This is where you can set the time which the data will be collected for the experiment, i.e., the full duration of the experiment. For example, if you select 1 hour, and your sample rate is every 1 minute, your experiment will sample data every minute for an hour and then stop. Duration can reach up to 999 hours.

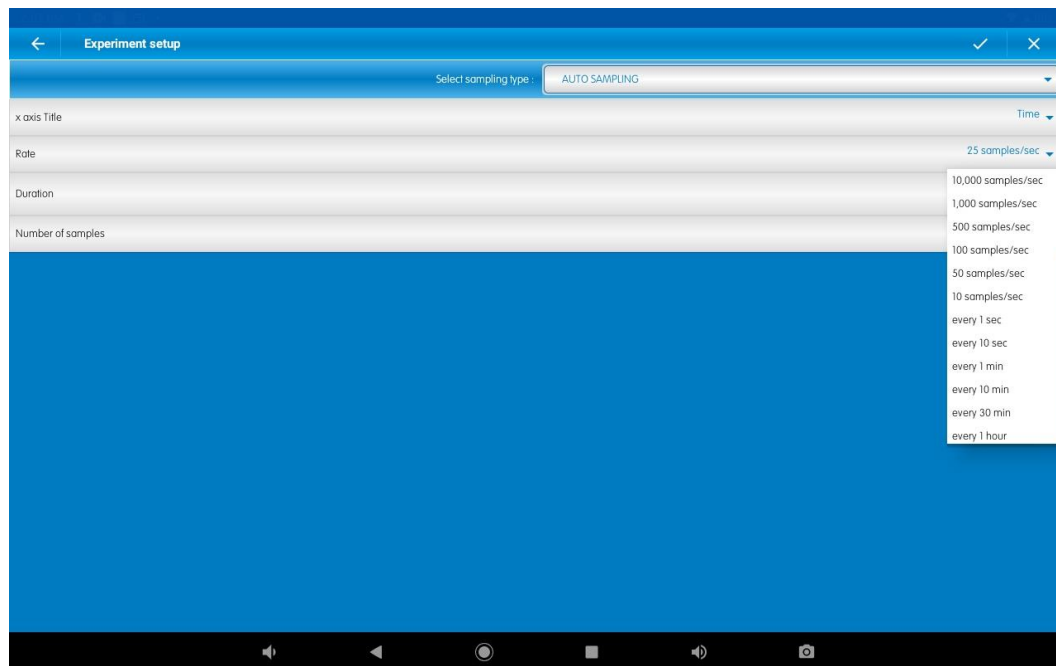
Note: For experiments that run for a long time, we recommend connecting the device to a power source to ensure it doesn't run out of battery.

HOURS	MINUTES	SECONDS
-	-	48
-	-	49
0	0	50
1	1	51
2	2	52

Number of samples: 50

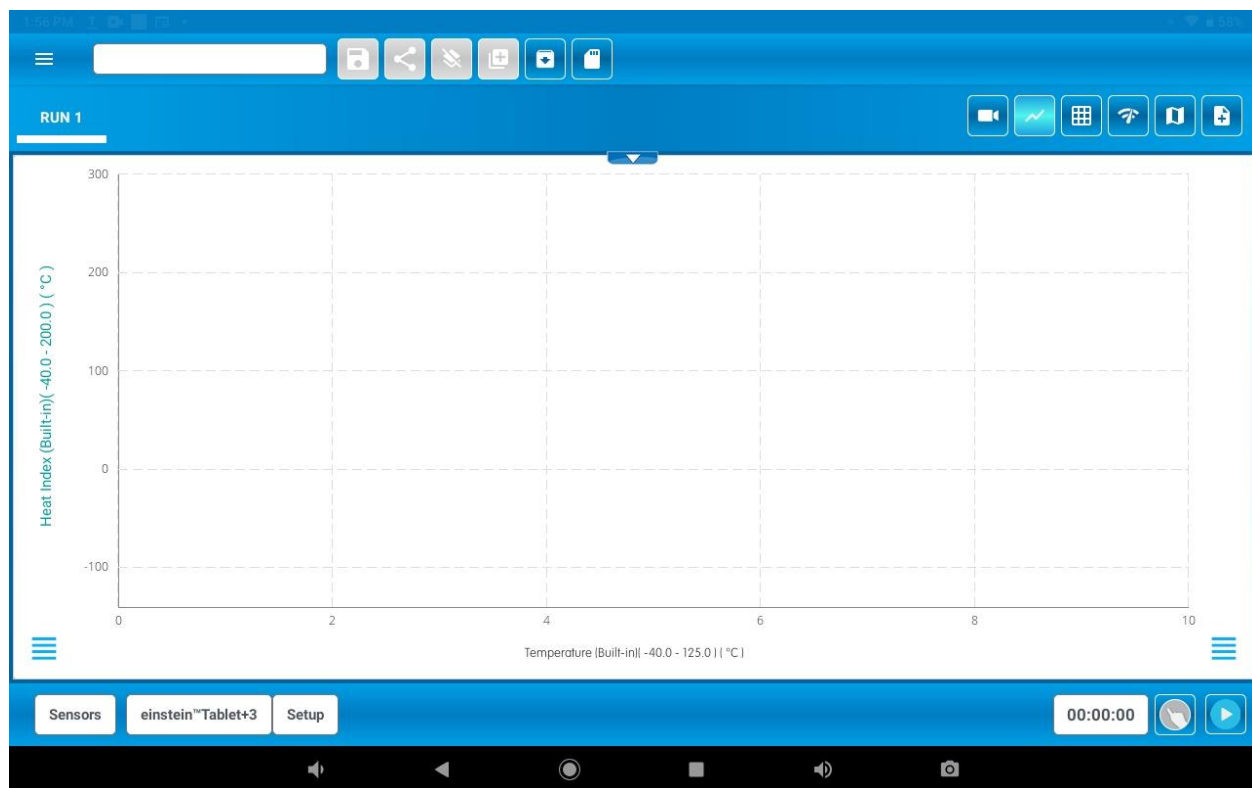
Sample Rate

Tap the arrow on the right of the **Rate** menu to select the sample rate of your experiment. For example, if you select **10 samples/sec**, the sensor will sample data 10 times per second. Some sensors have predetermined sample rates.



X-Axis Title

Select **X-Axis Title** in the setup menu and choose the parameter you want to appear in the X-axis. This can be done for any parameter, but it is especially useful for experiments measuring voltage against any parameter, or for experiments in which you'd like to see them on X vs. Y and not one above the other on the two Y axes.




Number of Samples

The sample number is calculated as follows: $(\text{Duration} \times \text{Sample Rate}) + 1$. The (+1) is because the sample number calculation always starts at 0 and adds 1. This can be seen in table mode view on the main experiment screen, where you'll see the measurement at 0 because of the N+1 formula.

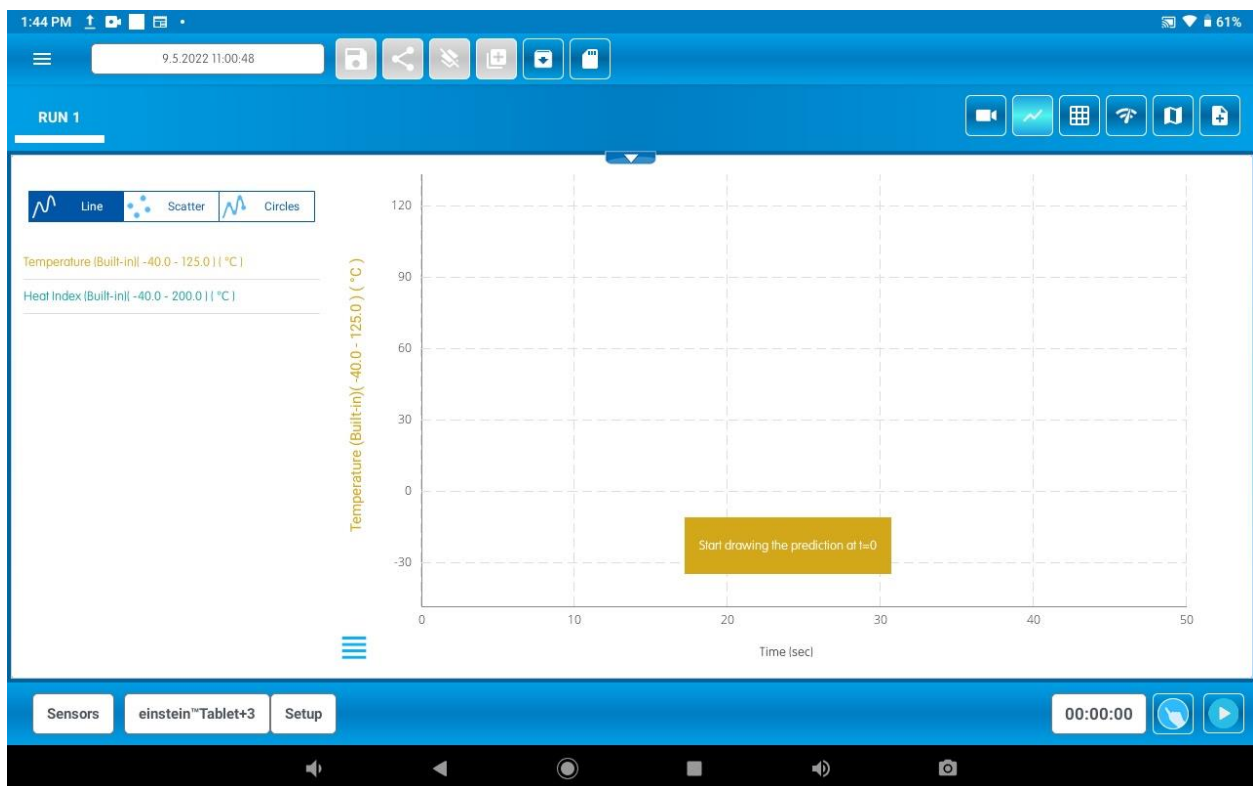
Prediction

The **Prediction** tool is available when selecting the **Auto Sampling** sampling type, and allows you to draw your prediction of the experiment outcome in the graph before running, and compare it to the actual result. This is a great way to provide students and yourself with exercises that compare your answer and input to real-time results.

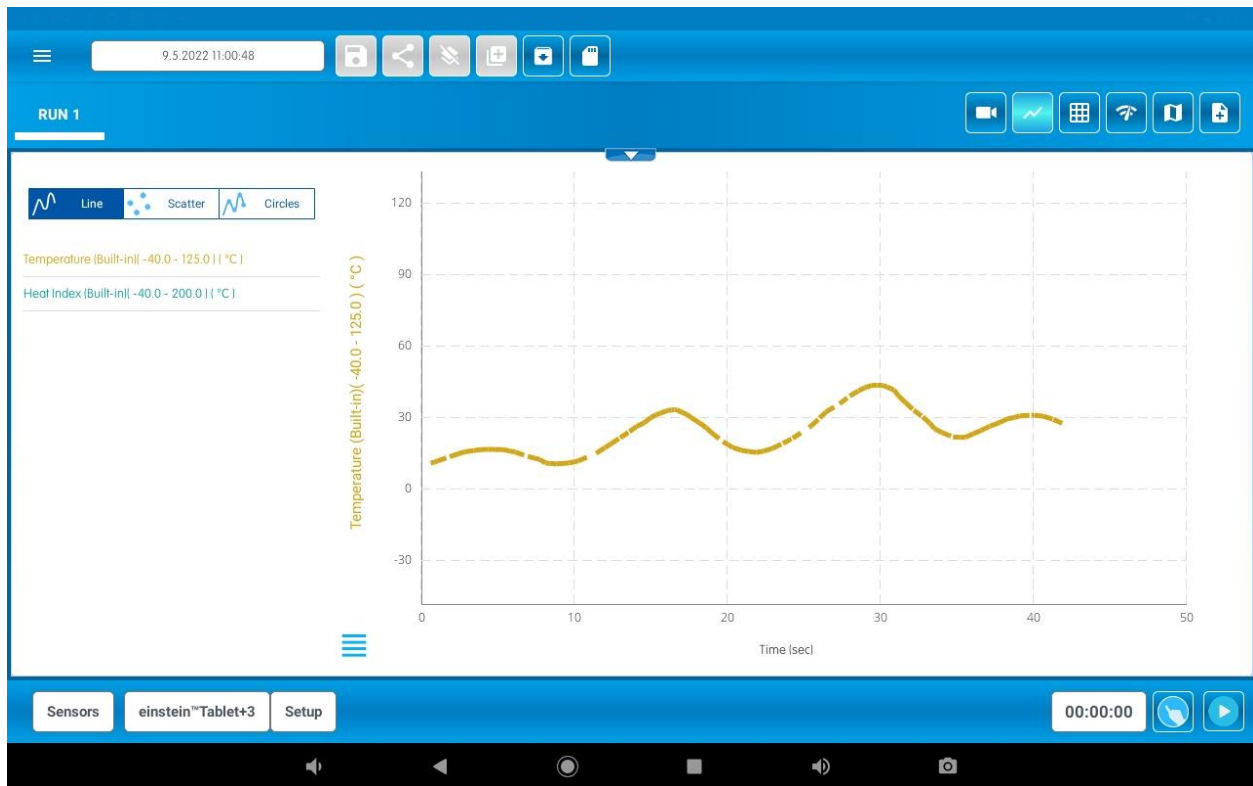
To use the **Prediction** tool, select it at the bottom of the main experiment screen: .

Before using the **Prediction** tool in the experiment, make sure your sensors are set up. To see how to set up your sensors, visit [Sensor Setup](#).

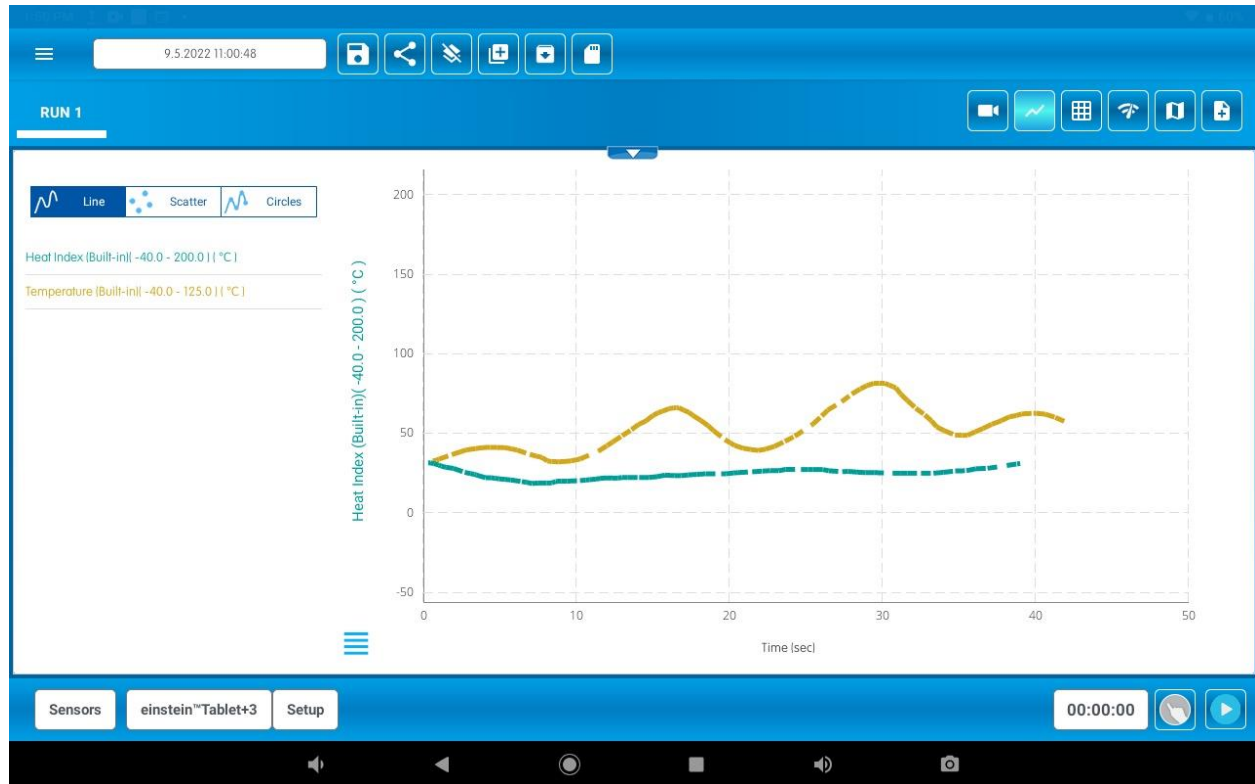
Once everything is ready, you'll be able to use the **Prediction** tool in your main experiment window. Tap on the Prediction tool icon. The sensors appear on the left and you can draw your prediction on the graph on the right.



Simply start drawing the line from the Time=0 line to predict the outcome of the experiment on the graph. The image below shows the graph after we've drawn our "predicted" line on it:



If you wish to draw another prediction, simply choose the sensor you would like to draw a prediction for and draw another prediction line.




Next, tap the run button at the bottom of the screen to start the experiment:

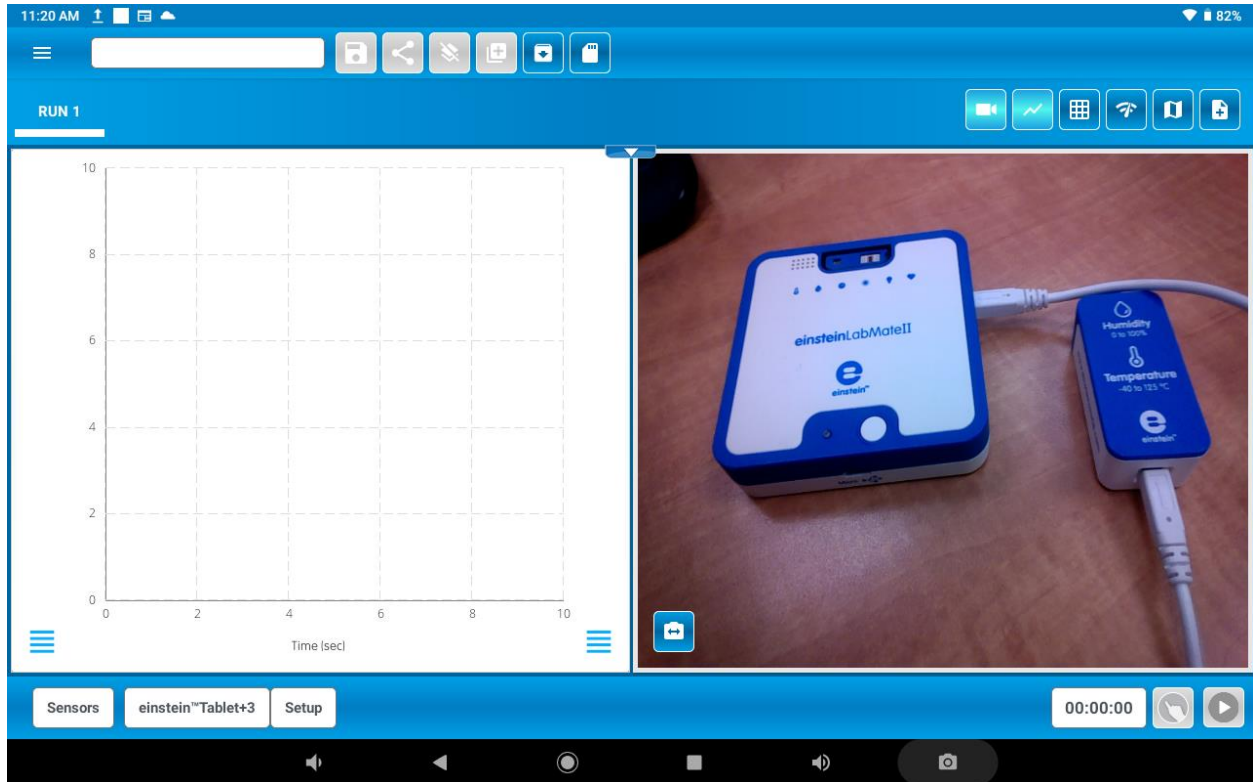


The line with the actual readings will appear on the graph together with the one you drew – allowing you to easily compare your prediction with the result.



Video Recording

To record video while running an experiment, tap the video recording icon . It will open a video screen window.

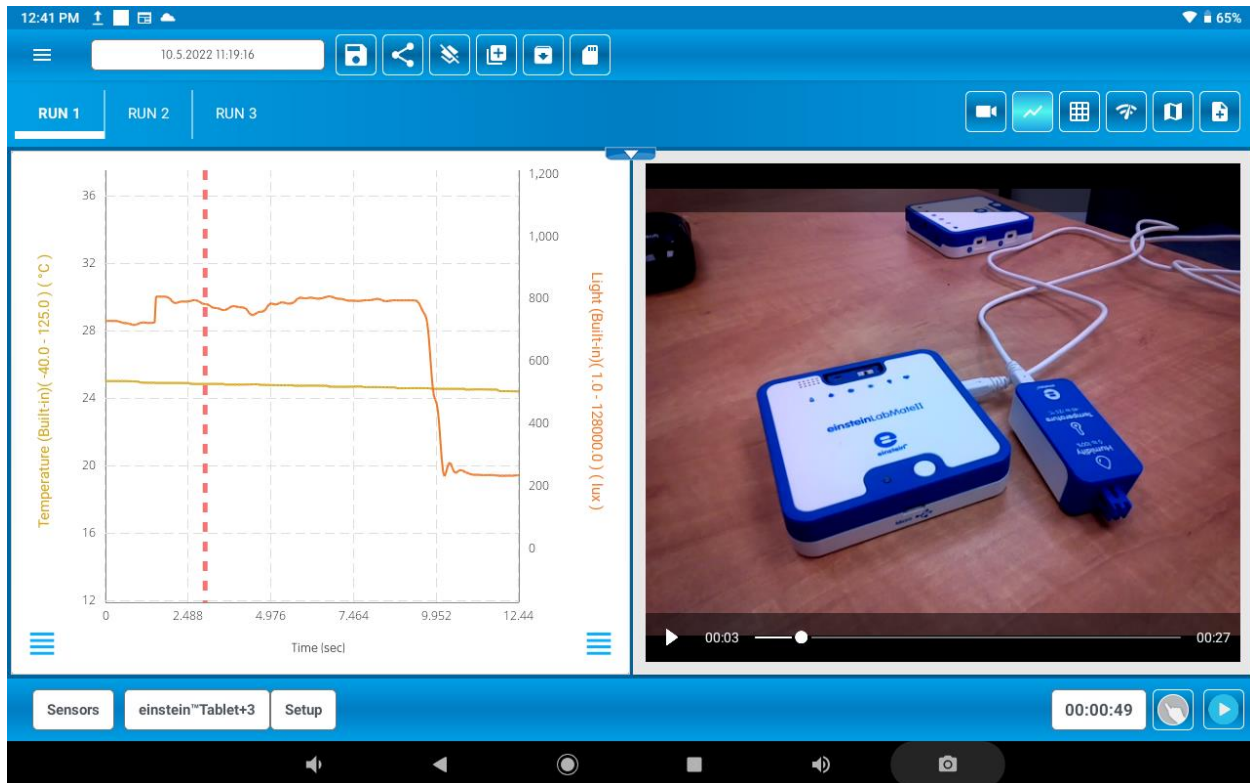


At the bottom left of the video screen, you change the front/back camera view.

After choosing the sensors, tap Run to start the experiment and recording. There will be a Rec sign on the top left of the video screen.



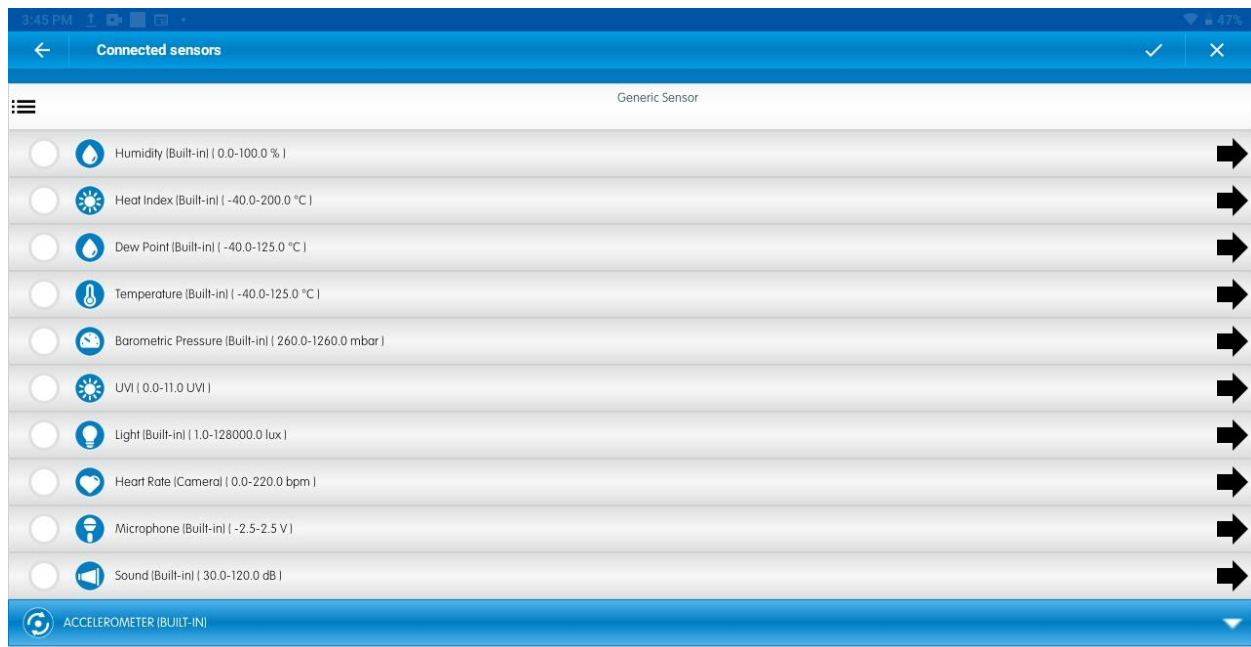
When loading an experiment with video, you can play the experiment. A line on the graph indicates the time on the video.



Connecting External Sensors

External sensors can be connected with a mini-USB cable. Simply connect the cable into one of the four numbered ports in your einstein™ tablet or LabMate. Once connected, the sensor will appear in the 'Sensor List' and can then be selected or unselected along with the built-in sensors.

Few sensors may require an adaptor to connect the sensor to your device. In these cases, an external sensor may need to be identified manually. When this happens, the sensor will appear as "Generic Sensor" in the list as shown below.



Simply tap the “Generic Sensor” menu icon box and select the current sensor from the list and tap the V to confirm and save selection.



Then the sensor's name will then appear and can be selected for the experiment.



Working with Multiple Sensors

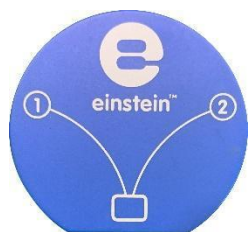
MiLABEx™ can operate with multiple sensors in order to create sophisticated experiments. If only one sensor is connected, you'll see the Y-axis on the left side, listing the units for one active sensor.

If two sensors are selected, you'll see two Y-axis – one on the left and one on the right. The Y-axis on the left represents the first sensor, and the Y-axis on the right represents the second sensor. When two identical sensors are connected (for example, two identical temperature sensors), they will appear as one Y-axis.

If three or more sensors are selected, you will only see 2 Y-axes on the left and right as described above. To view a different sensor on the Y-axis, tap the plotline of the desired sensor, the sensor's name and measurement units will be displayed.

How to connect 8 sensors with Einstein tablet or LabMate?

The einstein™ tablet and the LabMate each have four numbered slots to connect external sensors. If more sensors are needed, you can use an einstein™ splitter device (seen in the image below), which will split one slot into two slots.



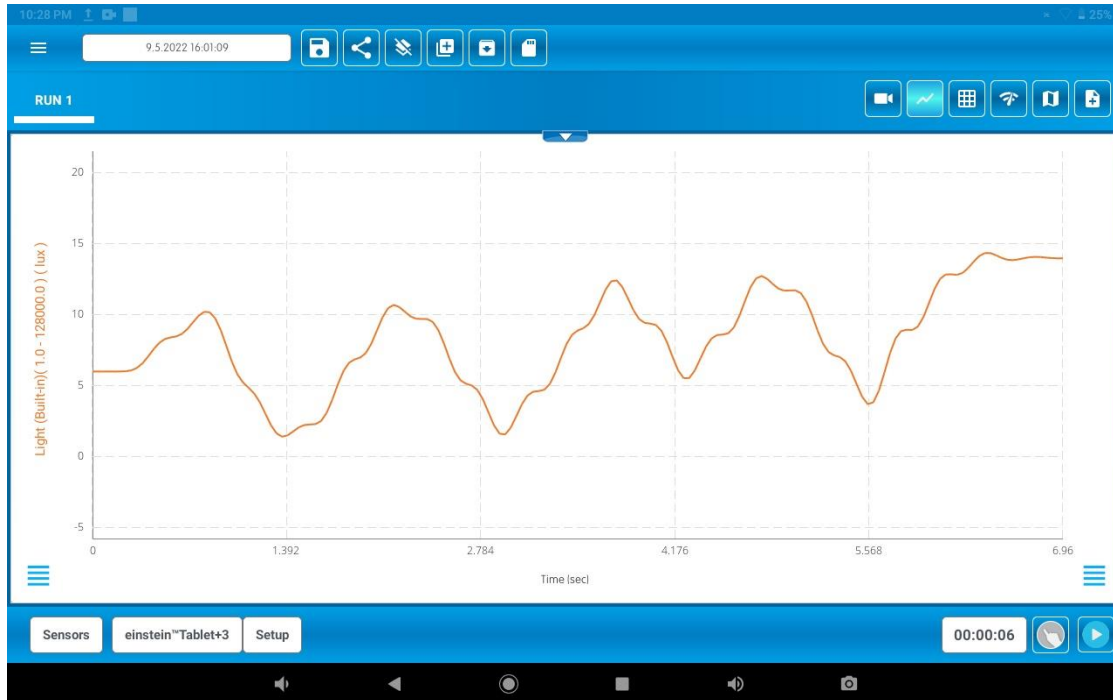
Data Views


You can select more than one view for each experiment run by selecting views in the top right menu of the experiment screen:

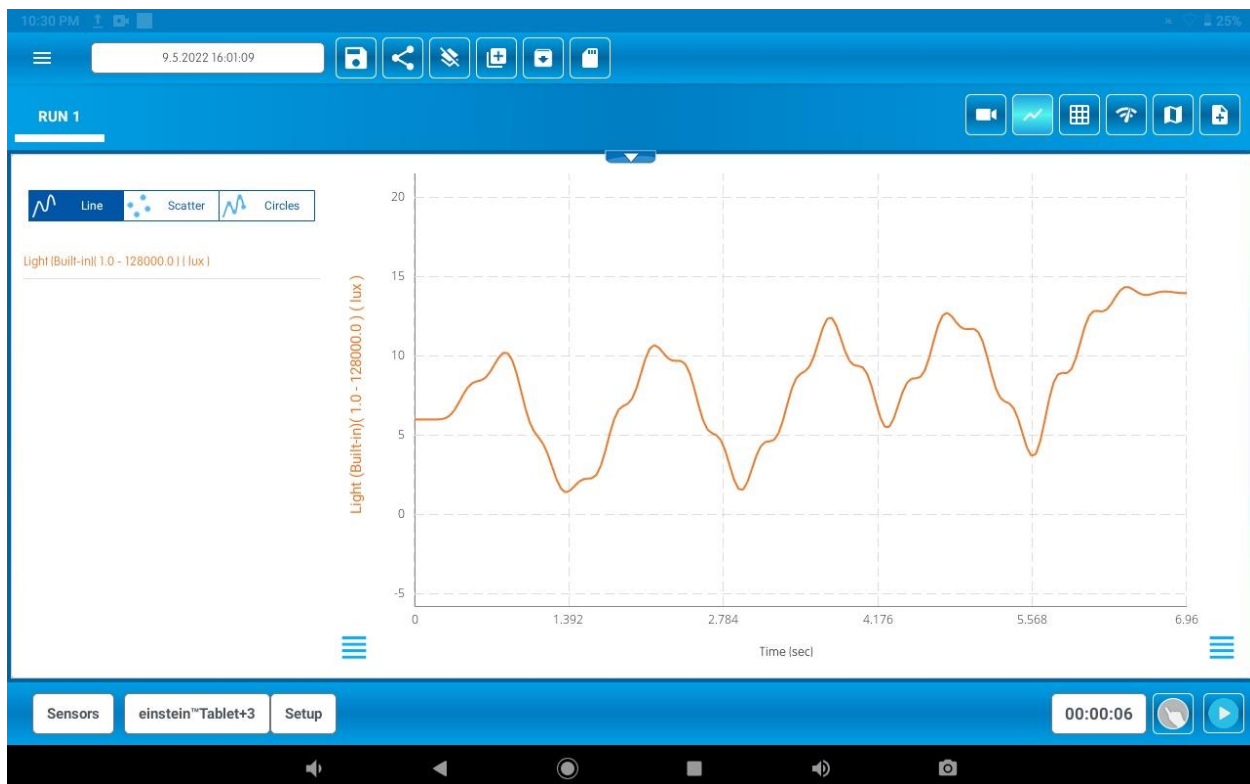


More than one view can be selected to show multiple views at the same time.

Graph View



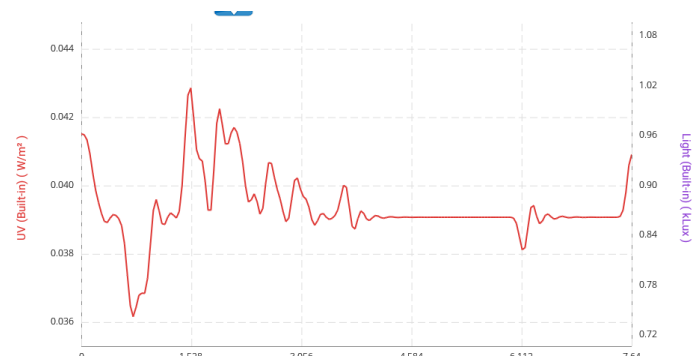
The default plot style is a line. Tap the bottom menu icon to select a different sensor view: 



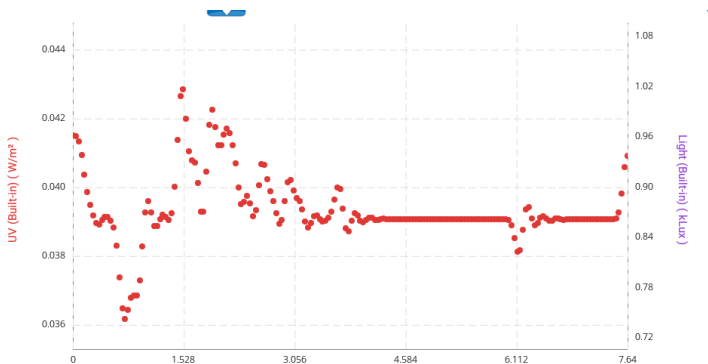
You can choose between: Line, Scatter, and Circles (combines Line and Scatter).



Line view:



Scatter view:

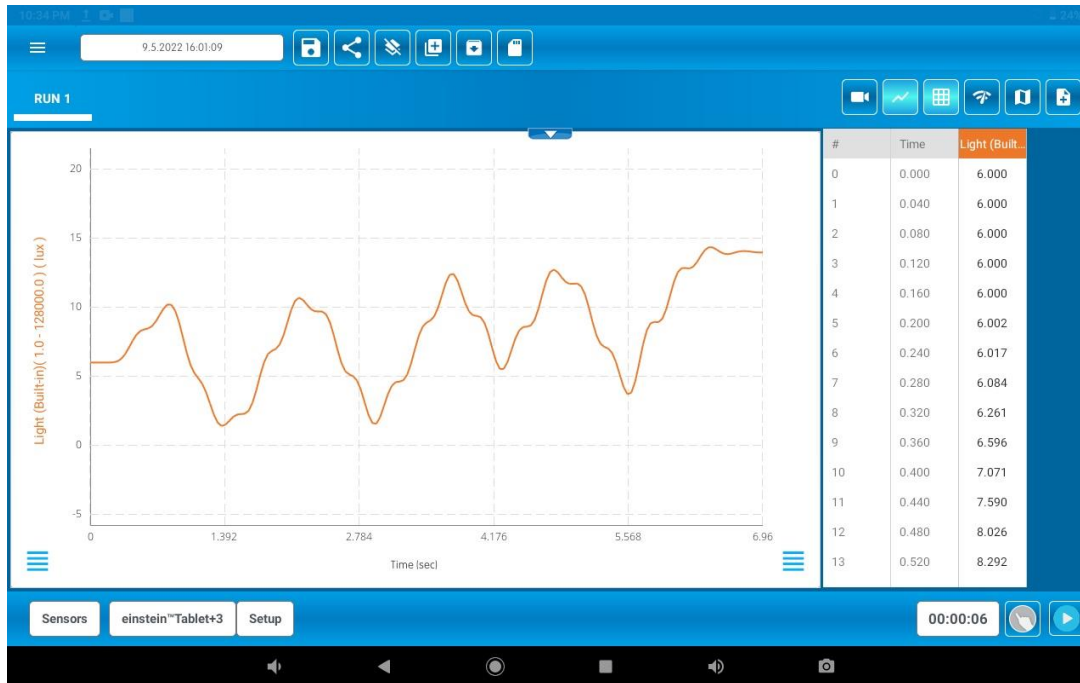


Circle's view:



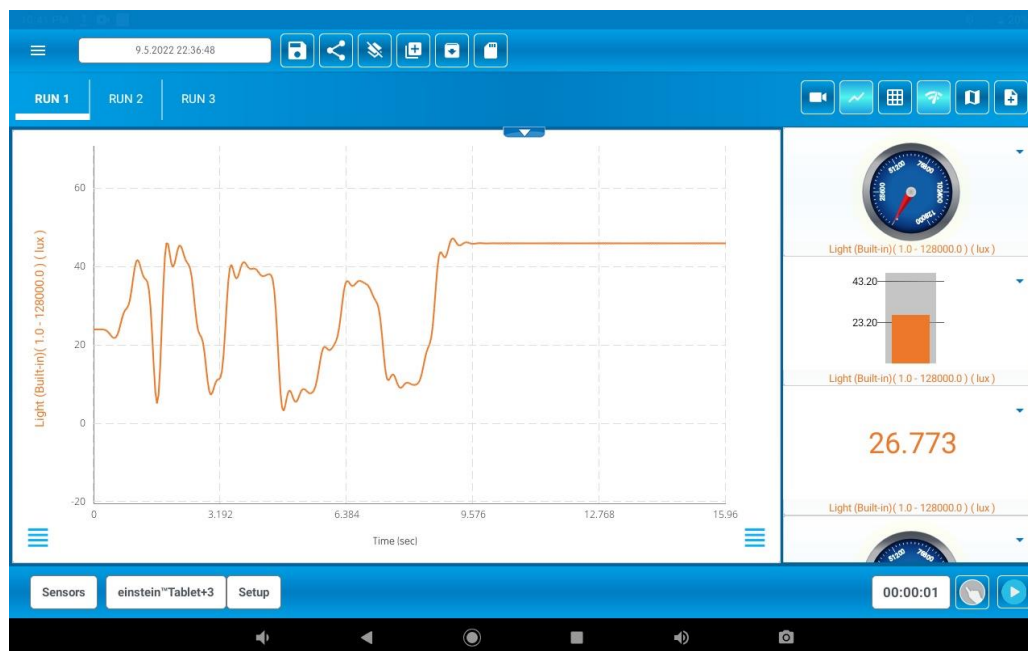
Table View

The below image shows the graph view as the main view, and the table view selected on the right. To show the table view in the center, simply tap the graph view icon to remove its view.



Meter View

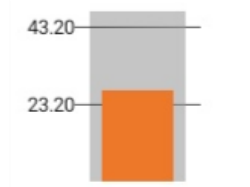
The below image shows the graph view as the main view, and the meter view selected on the right.



There are four types of meter views: Digital, Bar Graph, Analog, and Color.

26.773

Ligt (built-in) (-1.0 - 128000.0) (lux)



Ligt (built-in) (-1.0 - 128000.0) (lux)



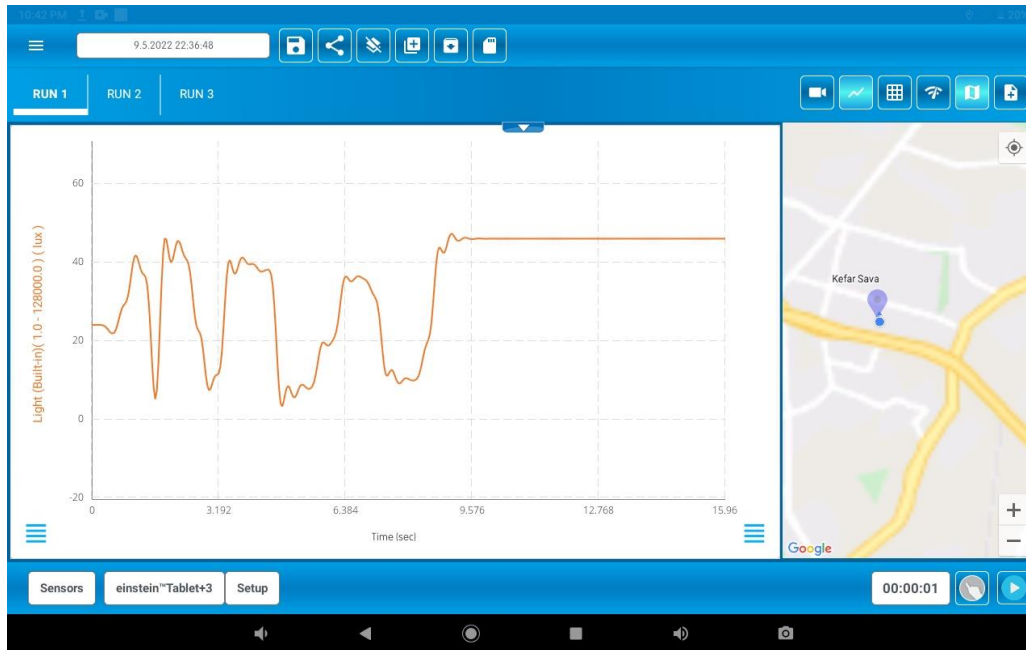
Temperature (built-in) (-40.0 - 125.0) (°C)



Temperature (built-in) (-40.0 - 125.0) (°C)

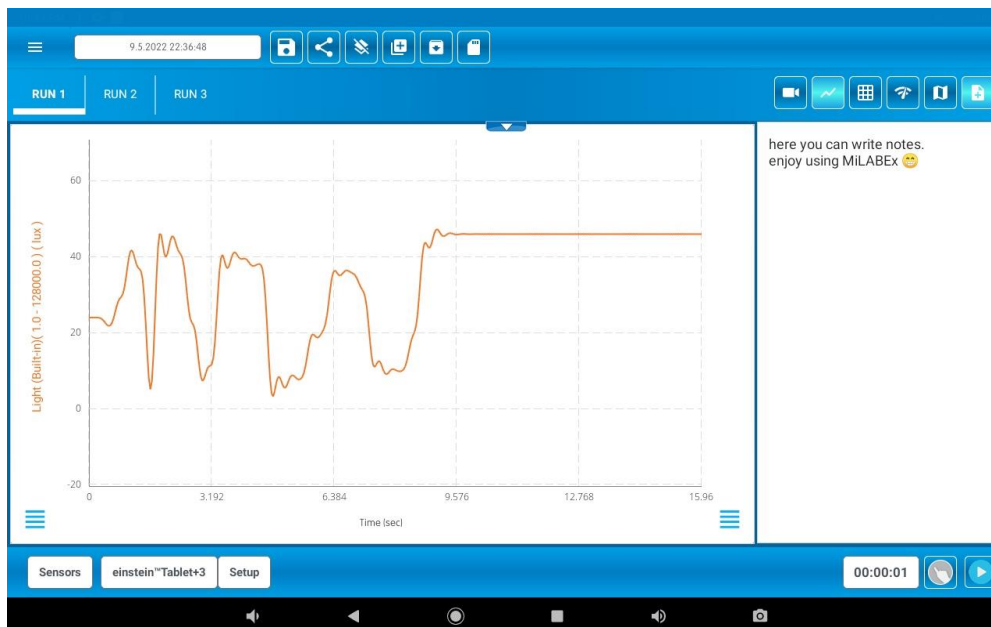
Map View

The below image shows the graph view as the main view, and the map (GPS) view selected on the right.



Notes View

The below image shows the graph view as the main view, and the notes window selected on the right.



Simply tap the text area to type in your note.

Zoom In & Out of Graphs & Maps

Graphs in MiLABEx™ represent the data from one or more sensors. By default, graphs auto-scale, which means you'll be able to see the entire graph on the screen. To zoom in on one part of the graph, touch the screen with two fingers and spread out. To zoom out, touch the screen with two fingers and pinch.



Pinch to zoom out



Spread to zoom in

The same method can be applied to zoom in and out of the map view.

Working with Functions

After running an experiment, you can mark points on the graph for X and Y coordinates and use a formula function. When marking a point, it will open a comment with the Y axis values. At the bottom of the graph, you can see the Y axis and the X axis. When you select the second point then it will show the difference between the two points under the X axis. Once points are selected on the graph, the sum icon (or sigma symbol) will appear at the top right of the screen.




Tap it to view the available functions you can use:



Functions are divided into two categories: CURVE FIT and MATHEMATICAL FUNCTIONS.

While some, like LINEAR, work automatically when selected, others may require configuration. To do so,

tap the settings gear icon near the function you'd like to use: 

Note: To run a function on a data set, the X-axis must show progression. In experiments where the X-axis represents time, this is not an issue. However, in some cases the X-axis displays fluctuating data. When this occurs, functions will not be available.

Available Functions

In the formulas below, G_1 and G_2 represent selected data sets or time series, and A, B, and C are constants that you can enter.

Curve Fit: Shows a curve fit line based on the graph and two selected points. Can be exponential, linear, polynomial, or power.

Absolute: $y = A|BG_1|$

Draws a line of the absolute values of a data set.

Add: $y = AG_1 + BG_2$

Draws a line of the addition of two data sets.

Derivative: $y_n = \frac{y_{n+1} - y_{n-1}}{2\Delta t}, \Delta t = \frac{1}{\text{sampling rate}}$

Draws a line of the slopes of every three consecutive points of a data set. For high recording rates and a small Δt , this line may be very noisy, which is why smoothing the data set is recommended before applying the derivative function.

Divide: $y = \frac{AG_1}{BG_2}$

Draws a line of the division of two data sets.

Exp.: $y = Ae^{BG_1} + C$

Draws a line of e raised to the power of a data set.

Integral: $y = A + B \sum G_1 \Delta t$

Draws a line in which each point is the discrete integral of all the preceding points in a data set.

Linear: $y = AG_1 + B$

Draws a line of linear displacement of a data set. This function is useful when you want to change the point of origin of a data set.

Ln: $y = A \ln(BG_1)$

Draws a line of the natural logarithm of a data set. The argument BG_1 must be positive.

Log 10: $y = A \log_{10}(BG_1)$

Draws a line of the logarithm of a data set to base 10. The argument BG_1 must be positive.

Multiply: $y = AG_1 \cdot BG_2$

Draws a line of the multiplication of two data sets,

Subtract: $y = AG_1 - BG_2$

Draws a line the subtraction of two data sets.

Square (x^2): $y = A(BG_1)^2$

Draws a line of the squares of a data set.

Square root: $y = A\sqrt{BG_1 + C}$

Draws a line of the square root values of a data set. The argument C_2G_1 must

be greater than or equal to zero.

Reciprocal

(1/X):

$$y = \frac{A}{G_1 + B} + C$$

Draws a line of the reciprocal values of a data set.

Once a function is selected, a new plot line will appear on the graph displaying the results.

Note: Some functions, such as **Subtract**, require that you select 2 points.

Saved Experiments

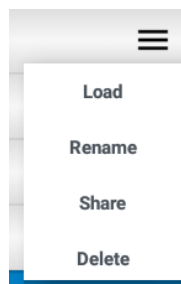
1. It is possible to access saved experiments after entering “Start an experiment”. Tap the

following icon to access saved experiments:



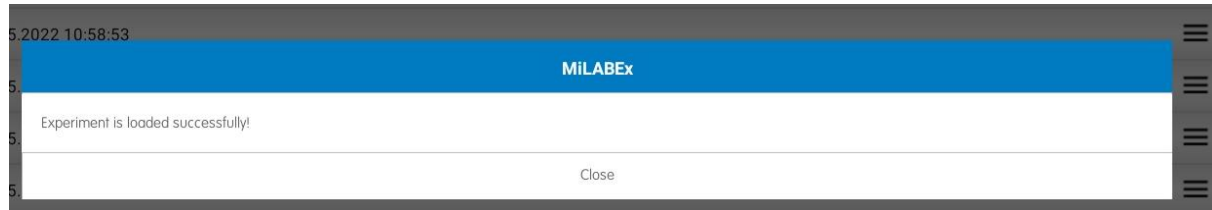
← Saved experiments ×	
EXPERIMENT A	≡
EXPERIMENT B	≡
2.2.2020 15:06:09	≡
2.2.2020 15:26:06	≡

To select an action for a saved experiment, tap the three menu lines beside the experiment name:



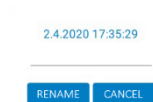
Load Experiment

Tap the three menu lines on the row of the experiment you'd like to load and tap **Load**. A popup notification will appear informing you that the experiment has loaded successfully. Tap **Close** and you'll automatically be sent to the MiLABEx™ experiment view.



Rename Experiment

Tap the three menu lines on the row of the experiment you'd like to rename and tap 'Rename'. A popup will appear allowing you to type in the experiment's new name.



Tap RENAME to save.

Share Experiment

Tap the three menu lines on the row of the experiment you'd like to share and tap 'Share'. A popup will appear at the bottom of the screen with your share options. You can share either as a .csv or .mib file. When sharing as an .mib file, please note that the recipient must have the MiLABEx™ app on his/her laptop to view the experiment.

Delete Experiment

Tap the three menu lines on the row of the experiment you'd like to delete and tap 'Delete'. A popup will appear asking if you're sure you'd like to delete.



Workbooks

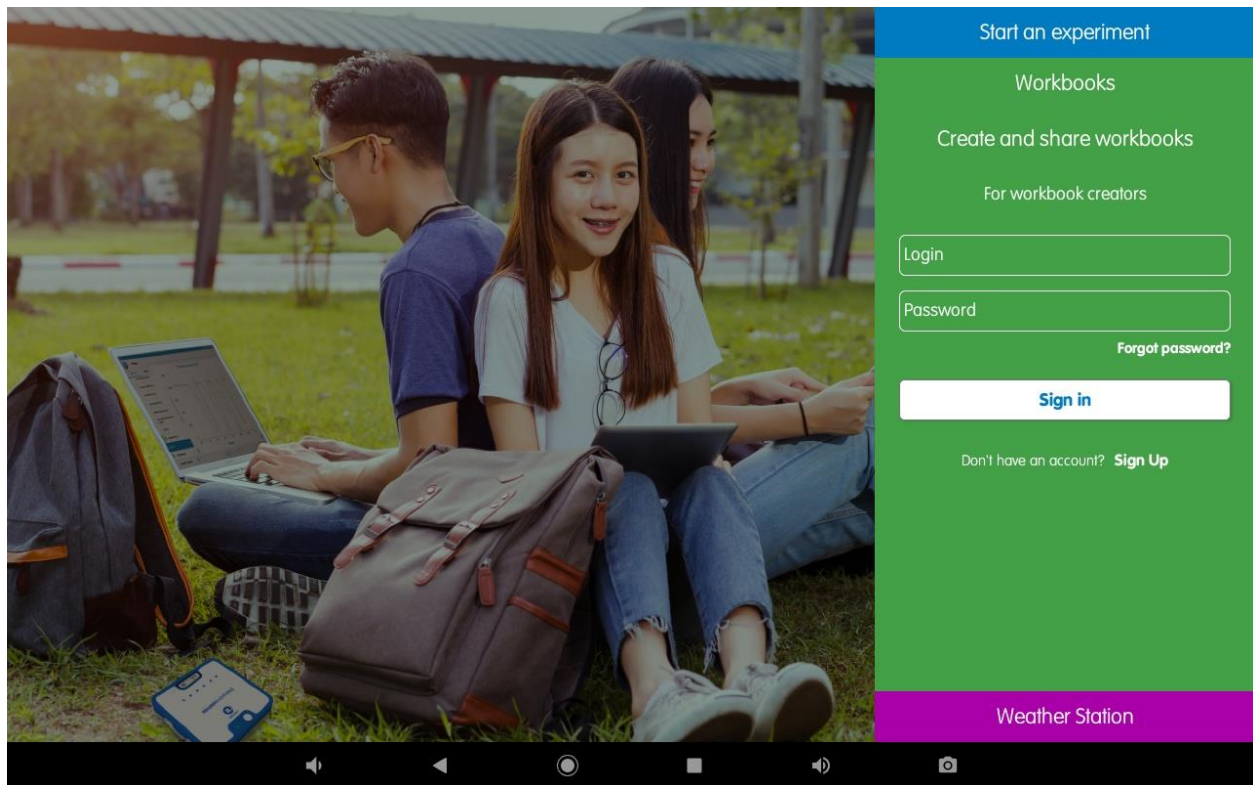
Workbook enables teachers, students and publishers to create activity in science which can includes background and experiments instructions, pre-setup and video demonstration. Then, it is possible to open the activity and run it in share the activity in the class or in the public store.

This chapter explains how to login, create the activity, and use existing experiments.

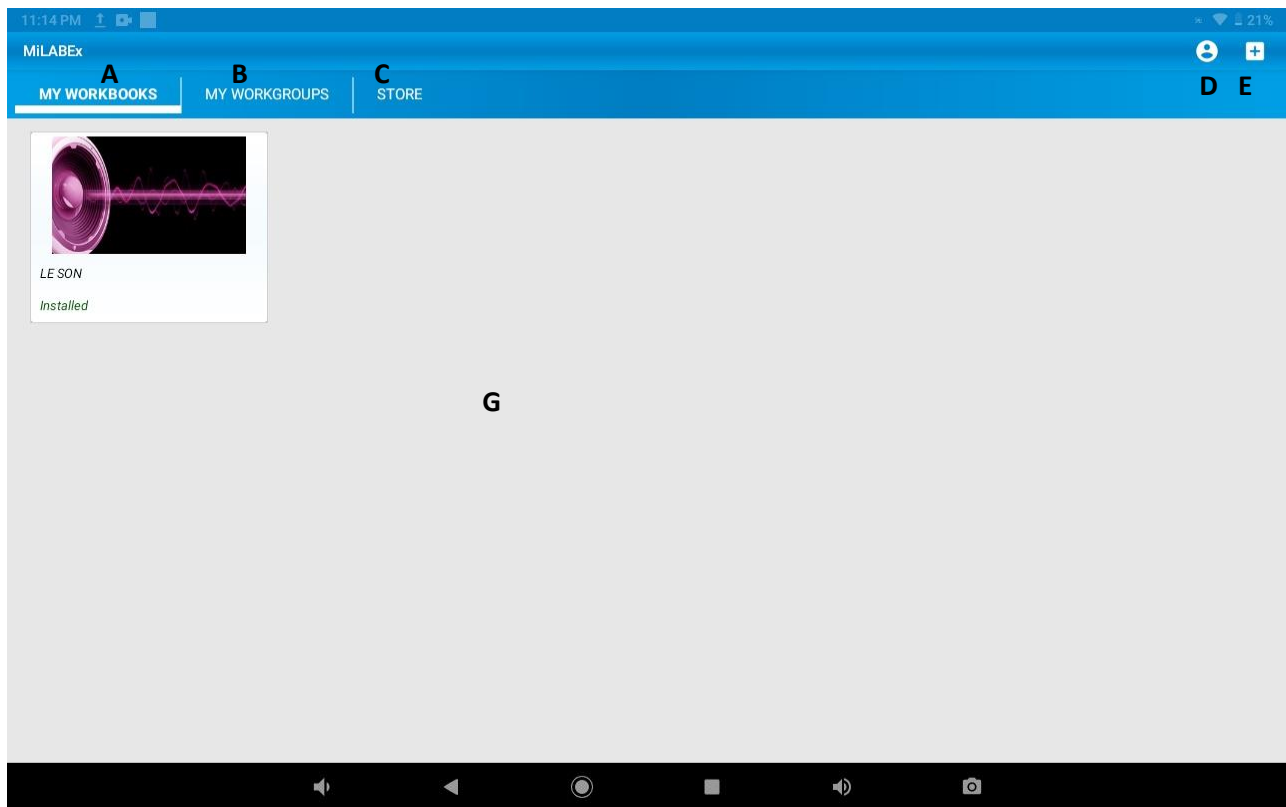
Introduction to the Workbooks Main Screen

Login

To open Workbooks, tap Workbooks. Then a login will open. Enter your account information or tap the 'Sign Up' link under the 'SIGN IN' button to create a new user.



Main screen



- A. My Workbooks: Shows the workbooks you've added to your personal library for quick access and workbooks that you've downloaded from the store.
- B. My Workgroups: Shows the workgroups you have created in your personal library.
- C. Store: Shows all accessible workbooks in the MiLABEx™ store from around the world. All workbooks that appear in the store have been approved by the Einstein World team and are available for free download or for a price determined by the creator. All workbooks are reviewed by the Einstein World team before they can be added to the store and used by all users. The review makes sure that the content is adequate and suitable for the store. It does not check the the experiment.
- D. Profile: Tap the icon to log out of your user
- E. Create a new workbook:
- F. Filter the workbooks view by language and/or category – Appears next to Create a new

workbook icon. This icon is available on the Store tab



- G. Main Screen: The main screen view is where you'll see the results of your selection, i.e., workbooks in the My Workbooks or Store tabs filtered by category/language (if selected).

Creating & Uploading a Workbook

Preparing the Activity Files to Create a New Workbook

To create a workbook, you need to start by preparing the activity files it will contain. These are content files in the supported formats: PDF, mp4, and JPEG.

Build your activity files on your computer or device of choice. Draft the text required for your work on any word processor that allows you to save in PDF format. It is important that your workbook include all the instructions and step-by-step guidelines to executing the experiment outlined in it. The PDF can include text and images. The final PDF must be uploaded to the device you're using.

To upload your activity into a workbook, you'll need to add at least two images and you may also add videos. Make sure the files you want to add are saved on the device you are using. Images should be in JPEG format. Video files should be in mp4 format. It is best to save all files to the downloads folder on your device you are using.

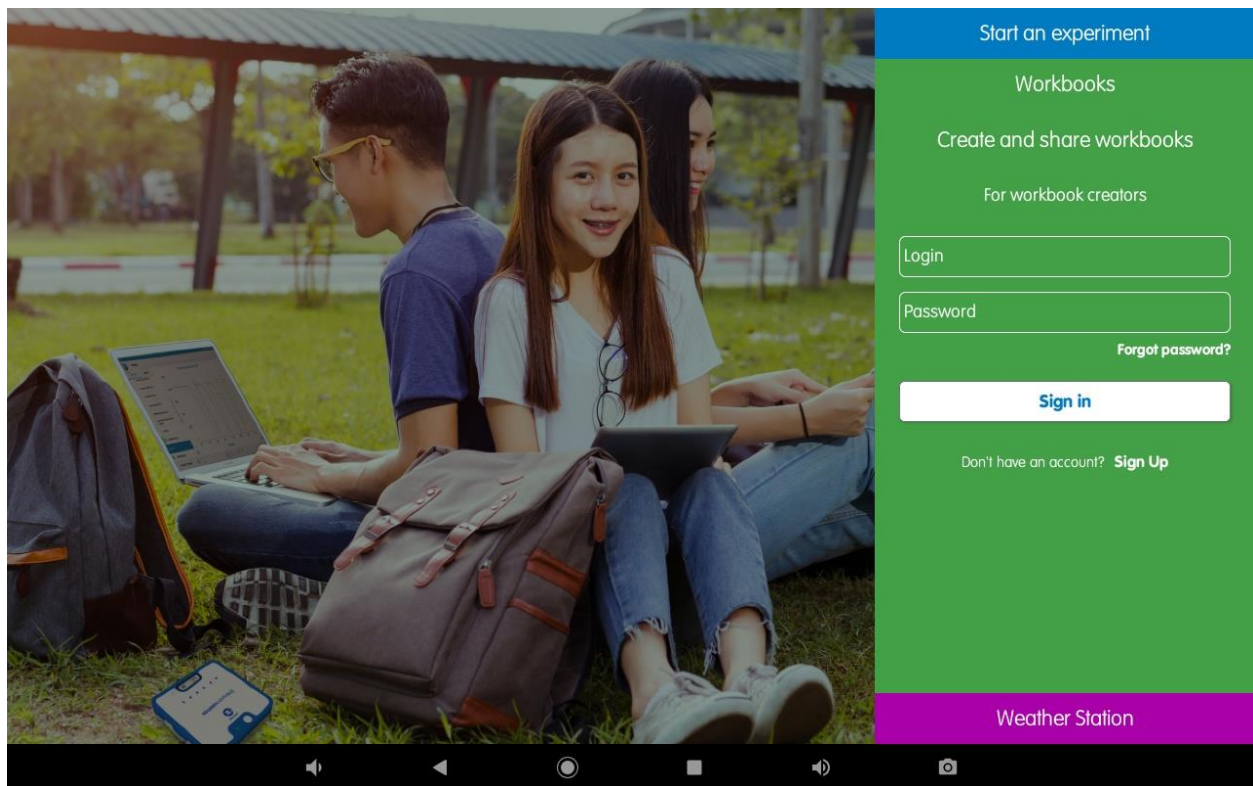
Note: The entire activity (including all files) must not exceed 25 MB.

Creating Your Workbook


Below is a step-by-step guide to creating your new workbook.

Step 1: Login

Enter your username and password and tap the Sign In button on the main home screen.



Step 2: Create new icon

Make sure you are on the **My Workbooks** tab and tap the + icon in the top right menu: . After you tap the + icon a new screen will open with tabs and fields to fill-in.

Step 3: Properties Tab

Creating New Workbook – Public Store selected

11:26 PM 30%

MILABEx

PROPERTIES DOCUMENT SENSORS SETUP VIDEOS

Public Store ☒ A

Name (Mandatory): (max 42 characters) 0

C


Description (Mandatory): (max 240 characters) 0


D


Category (Mandatory)

E Biology

Workbook Icon (Mandatory)







Creating New Workbook – Workgroups selected

MILABEx

PROPERTIES DOCUMENT SENSORS SETUP VIDEOS

Workgroups ☒ A ?

B

Name (Mandatory): (max 42 characters) 0

C


Description (Mandatory): (max 240 characters) 0


D

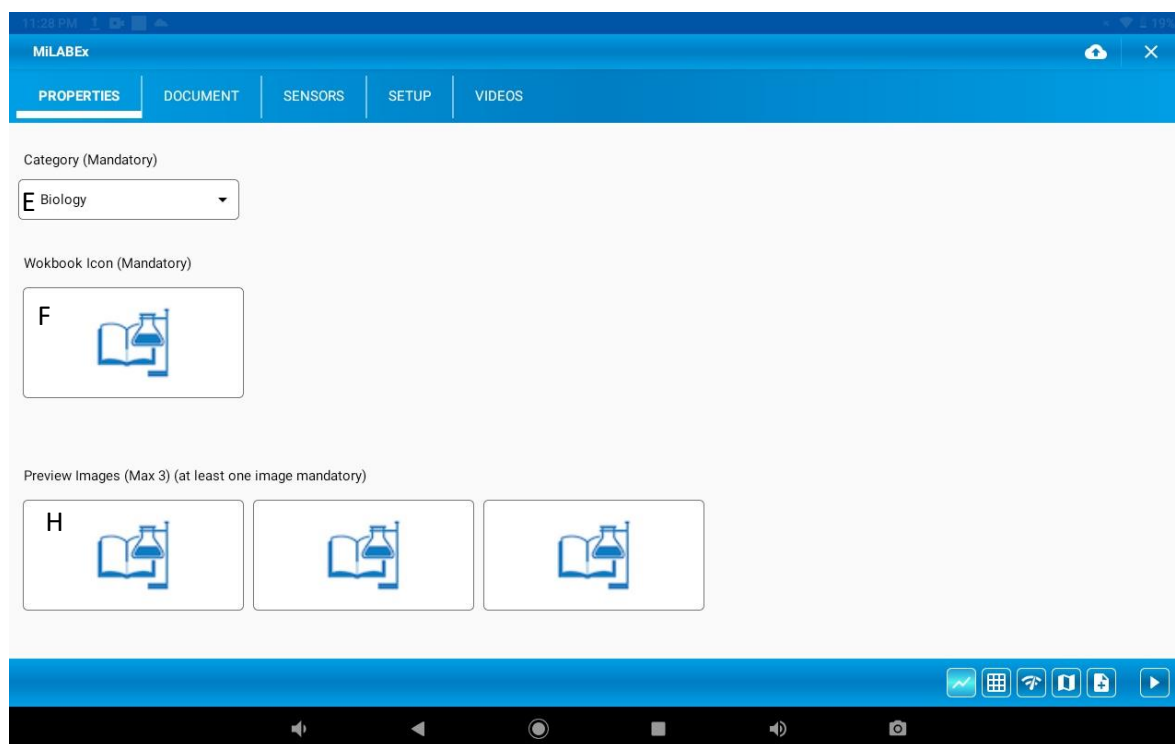
Category (Mandatory)


E Biology

Workbook Icon (Mandatory)

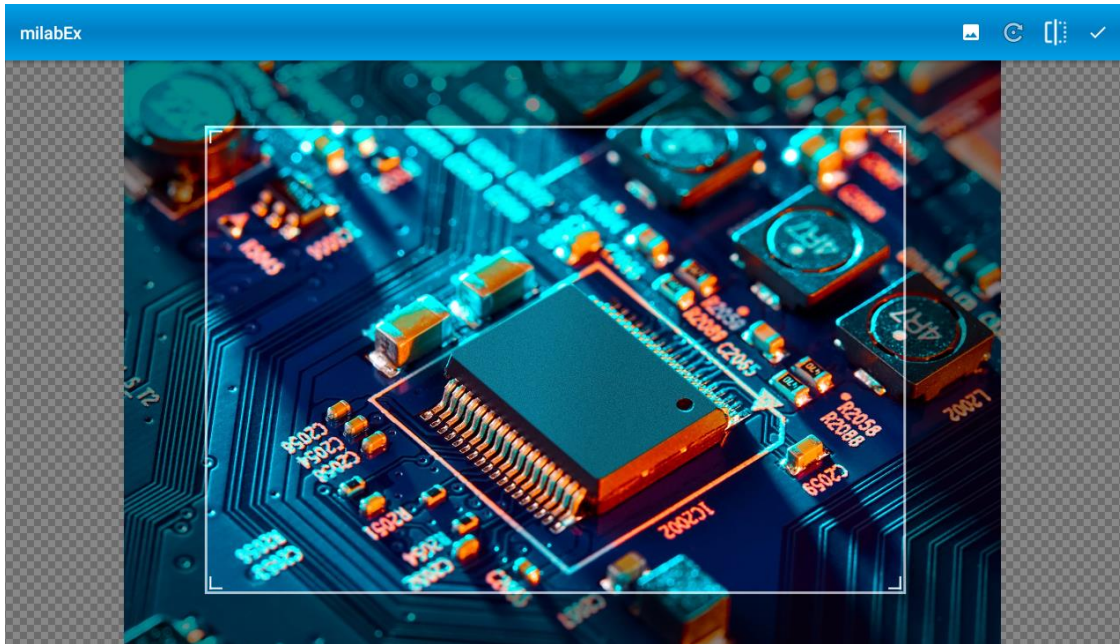






- A. Public store/workgroups - Allow the experiment to be published in the public store or as an experiment that can be accessed with a workgroup ID
- B. Workgroup ID: This field will only appear if you choose the Workgroup option. Enter a new workgroup ID to create a new workgroup or use an existing workgroup ID to add your workbook to an existing workgroup. Workgroup IDs can be any combination of characters and numbers (at least 4 characters). When sharing the workbook with students, they'll only need the ID to access it from the MiLABEx™ app by tapping the **Workgroups** button on the main screen.
- C. Name: Write the file name for your workbook. The file name is limited to 45 characters.
- D. Description: Provide a brief description of the workbook's activity and what it includes, such as files, experiment type, what students will learn, concrete takeaways, grade level, etc. The description is limited to 240 characters.
- E. Category: Choose one from the available options.
- F. Workbook Icon: To insert an icon, tap the box. A new page will open. Tap the gallery icon () in the top right corner to select the icon image from your device's storage folders, gallery, or camera. Once an image is selected, you'll be able to edit it by dragging the center square to determine

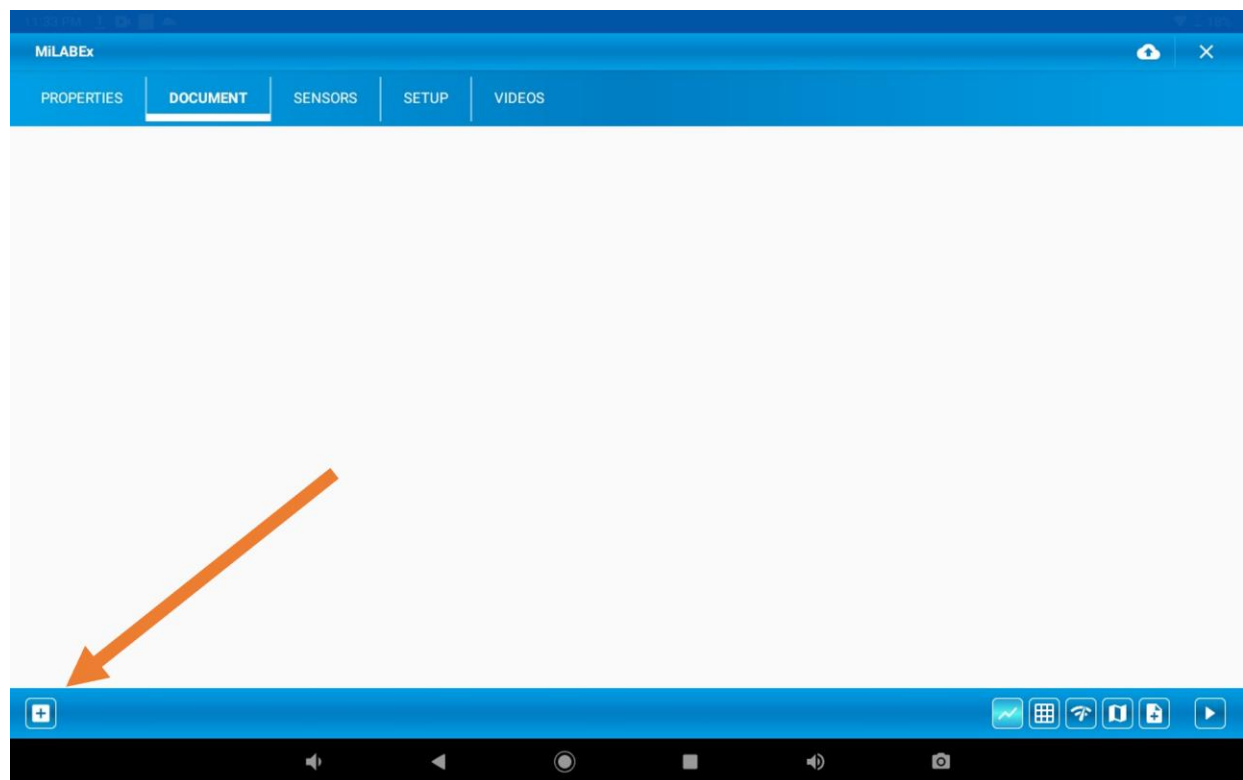
what part of the image will be shown, and using the top right menu to flip counterclockwise, horizontally, and vertically. Tap the white checkmark in the top right menu to confirm. Please note that adding an image is required.



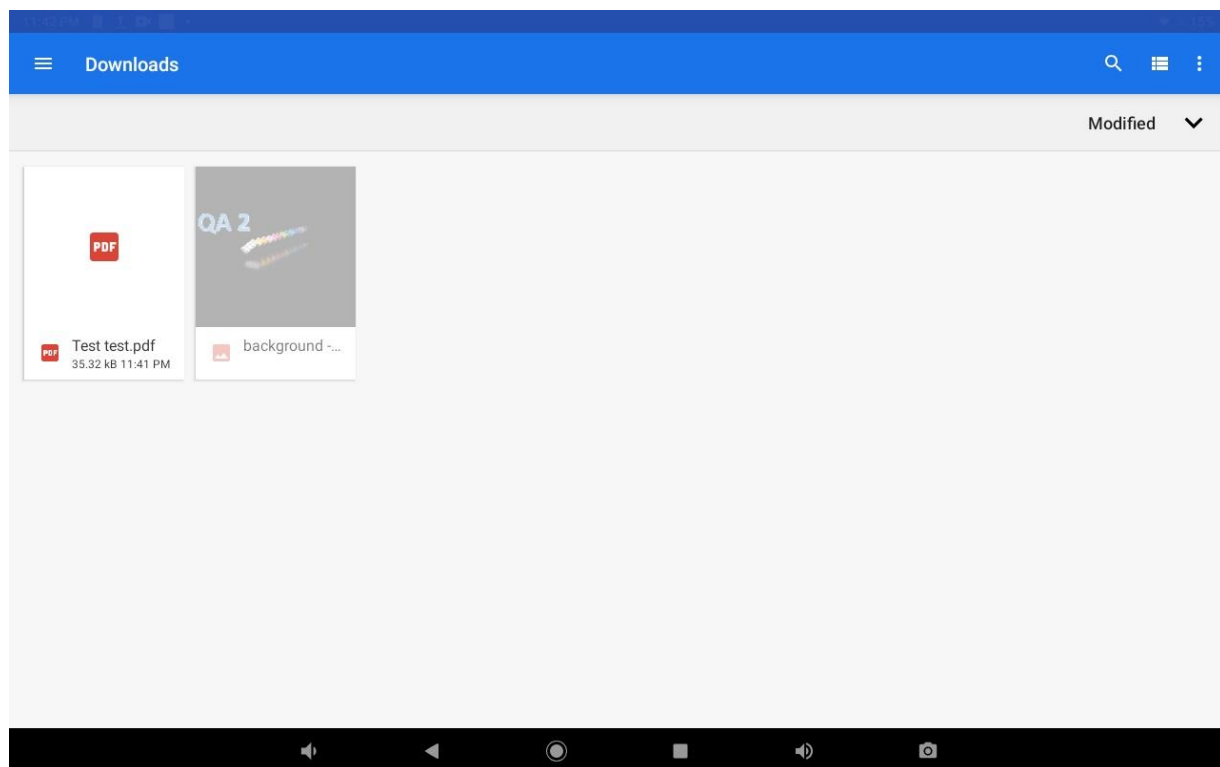
- H. Preview Images: Follow the same instructions as the previous step. Add up to three images for the workbook's preview. You must add at least one before continuing to the next step.

Step 4: Document Tab

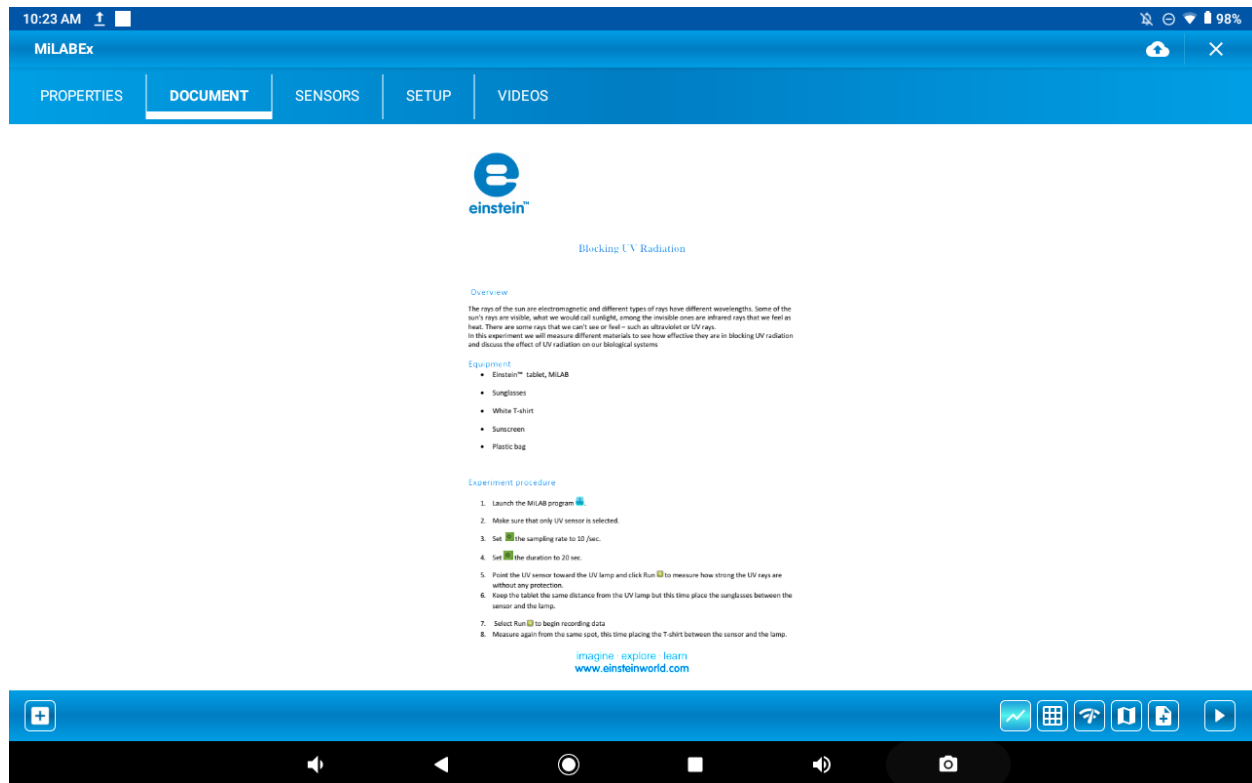
Tap on the Document Tab and the + icon to upload a PDF file from your device.



Choose the file from your device



After selecting the file, it will be displayed on the screen

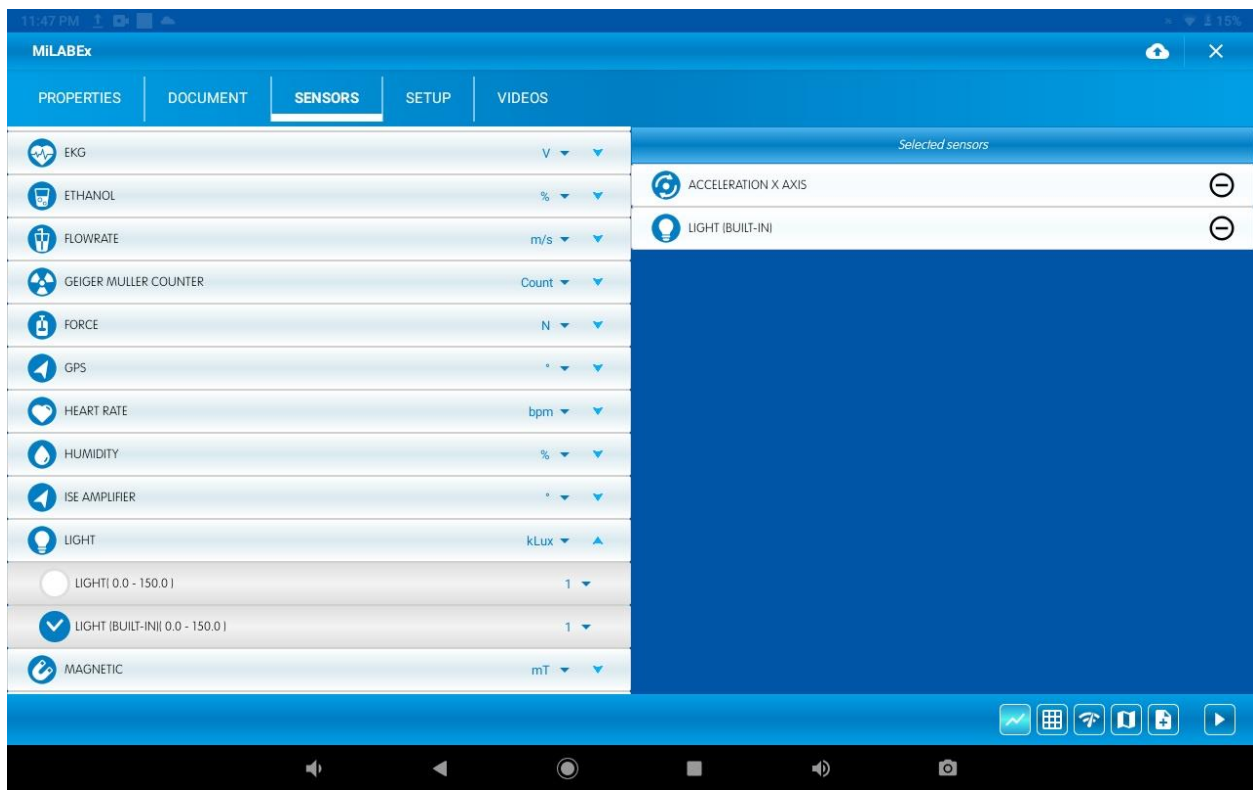


Step 5: Sensors Tab

Tap the Sensors tab. A list of sensors will appear. Select the sensors required for your workbook's experiment. If you wish to select multiple sensors for the same metric, tap the sensor to open a dropdown menu of additional sensors of the same type. For example, tap on **Temperature**, and select numerous types of temperature sensors that are available. Tap on the sensor(s) you want to use and select the number of sensors you'd like to add in the dropdown option with the down arrow.

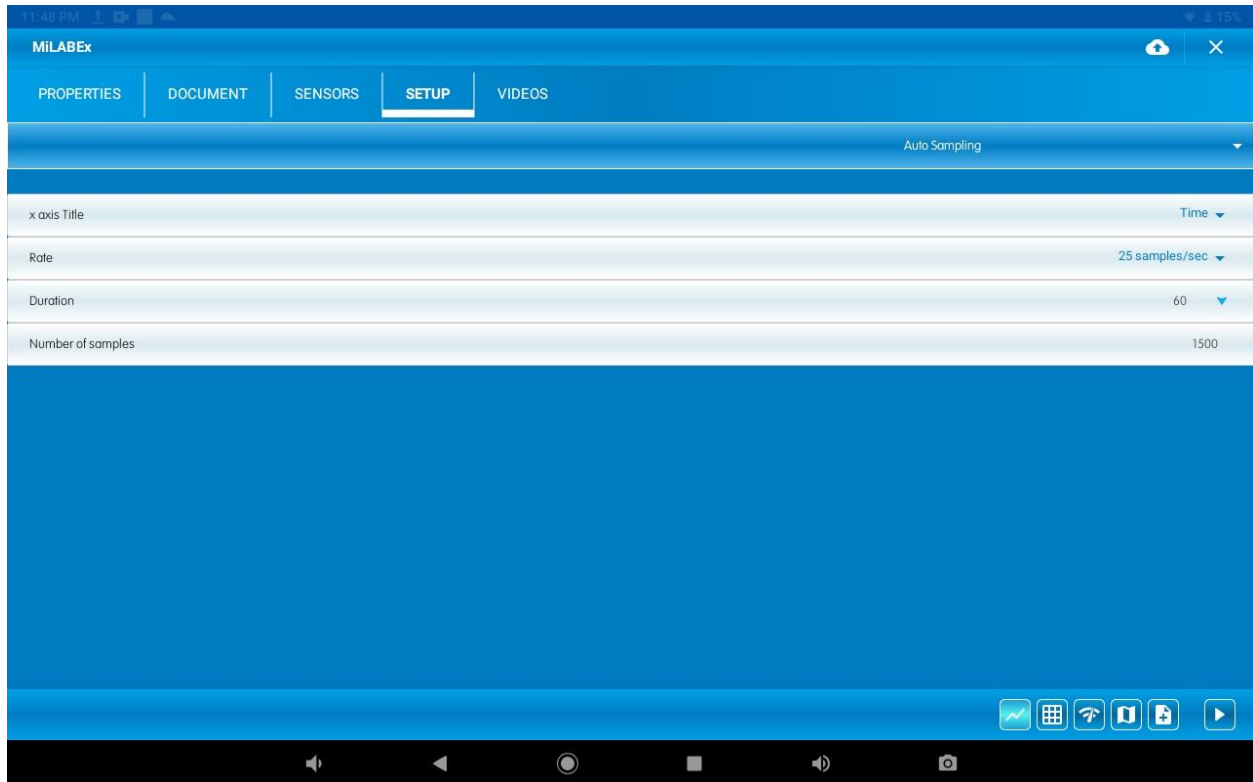


Tap the sensor you'd like to add and select by tapping the empty circle. Selected sensors will appear on the right with a white checkmark in the circle beside the sensor name.



Step 6: Setup tab

Tap **Setup** in the menu and follow the instructions on [Setting Up Parameters for Your Experiment](#) to set up your experiment. Once you've selected all the sensors and completed the experiment setup, tap on the checkmark at the top right corner of the screen to confirm your changes, which will automatically be added to your workbook.

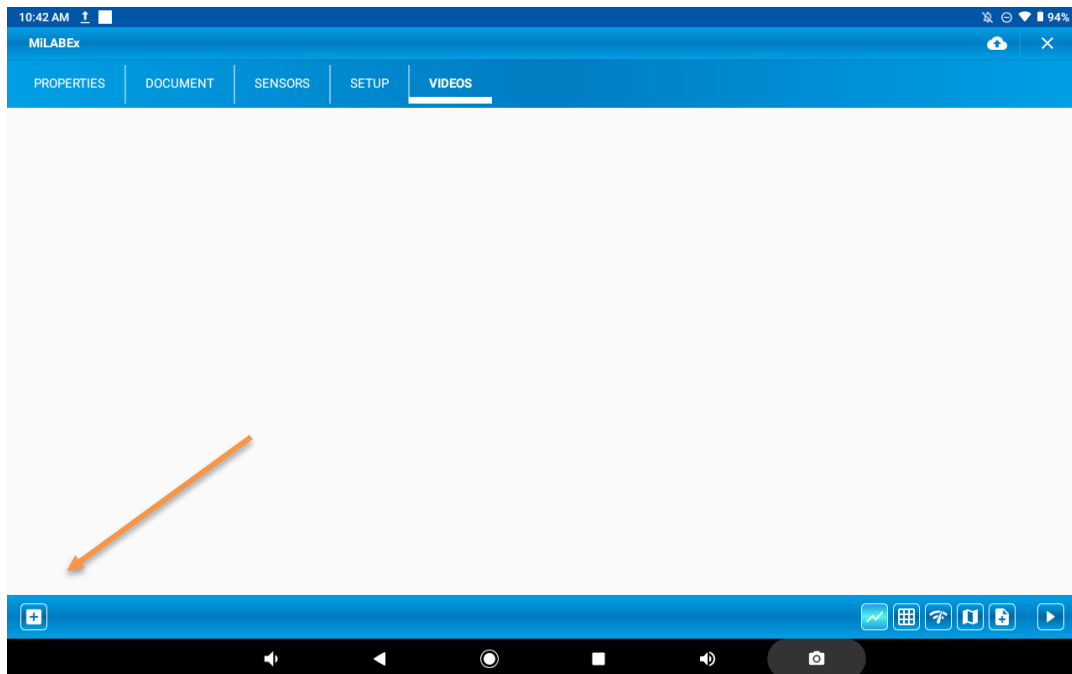


Click the white checkmark at the top when you're finished with the setup.

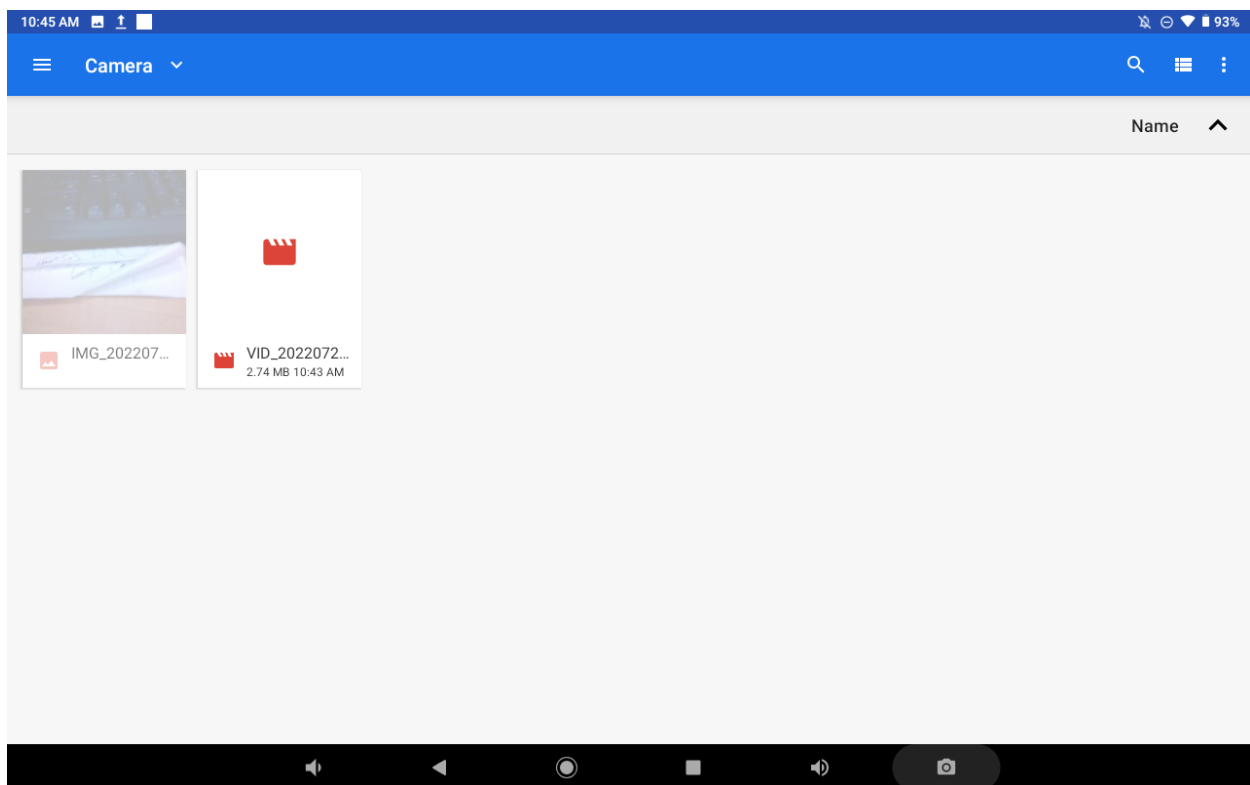
Step 7: Video Tab - optional

It is possible to add Video to give further explanation for the experiment.

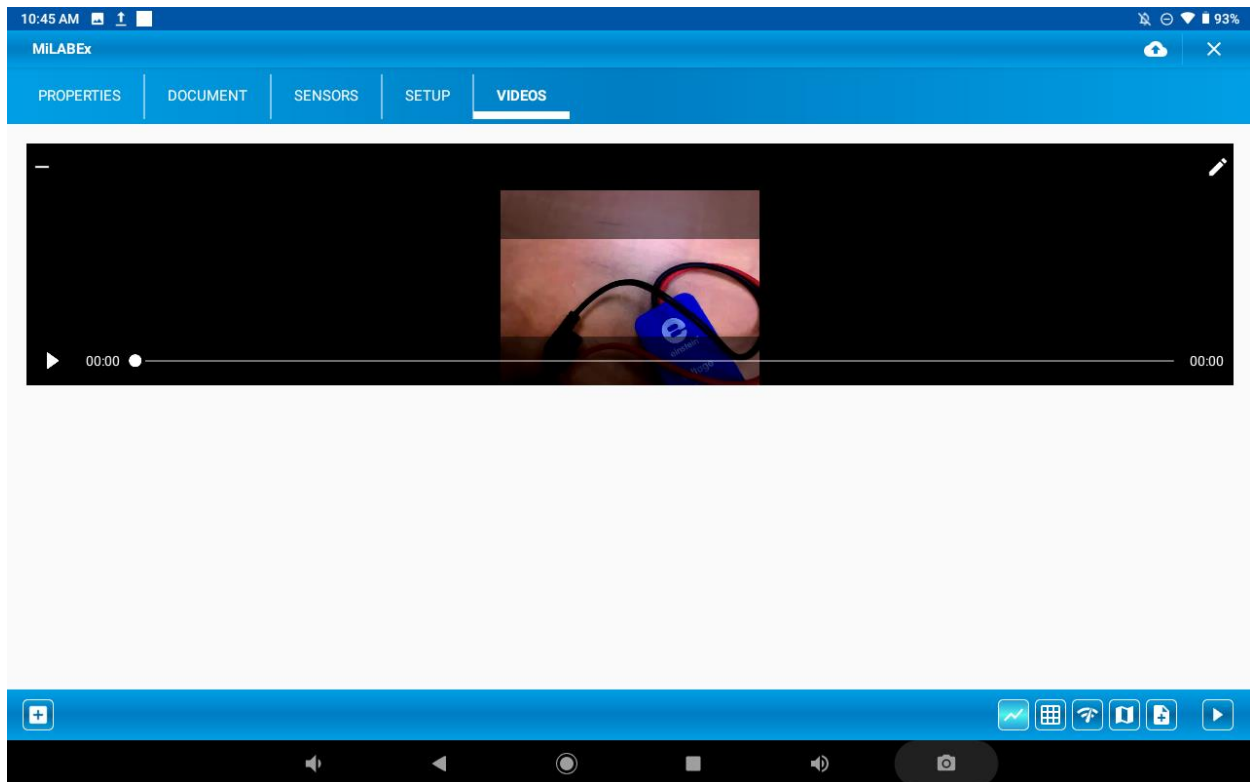
To upload a video tap on the + icon, on the bottom left as shown below




Then choose the file you want to upload



The video is uploaded to the workgroup



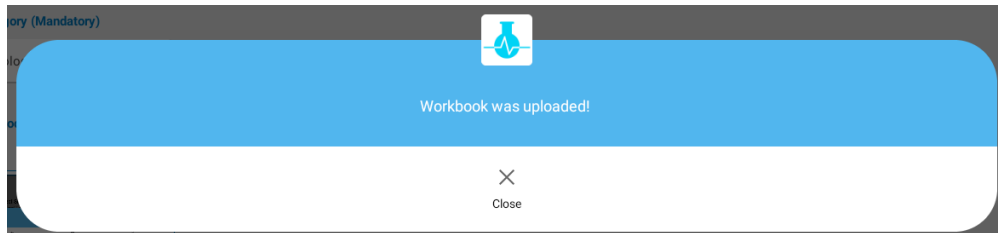
step 8: Upload Workbook

Once you finish setting all the text, documents, and images, it is time to upload the workbook to the store or to your Worgroup file. Tap the cloud icon () in the top right corner of the screen.

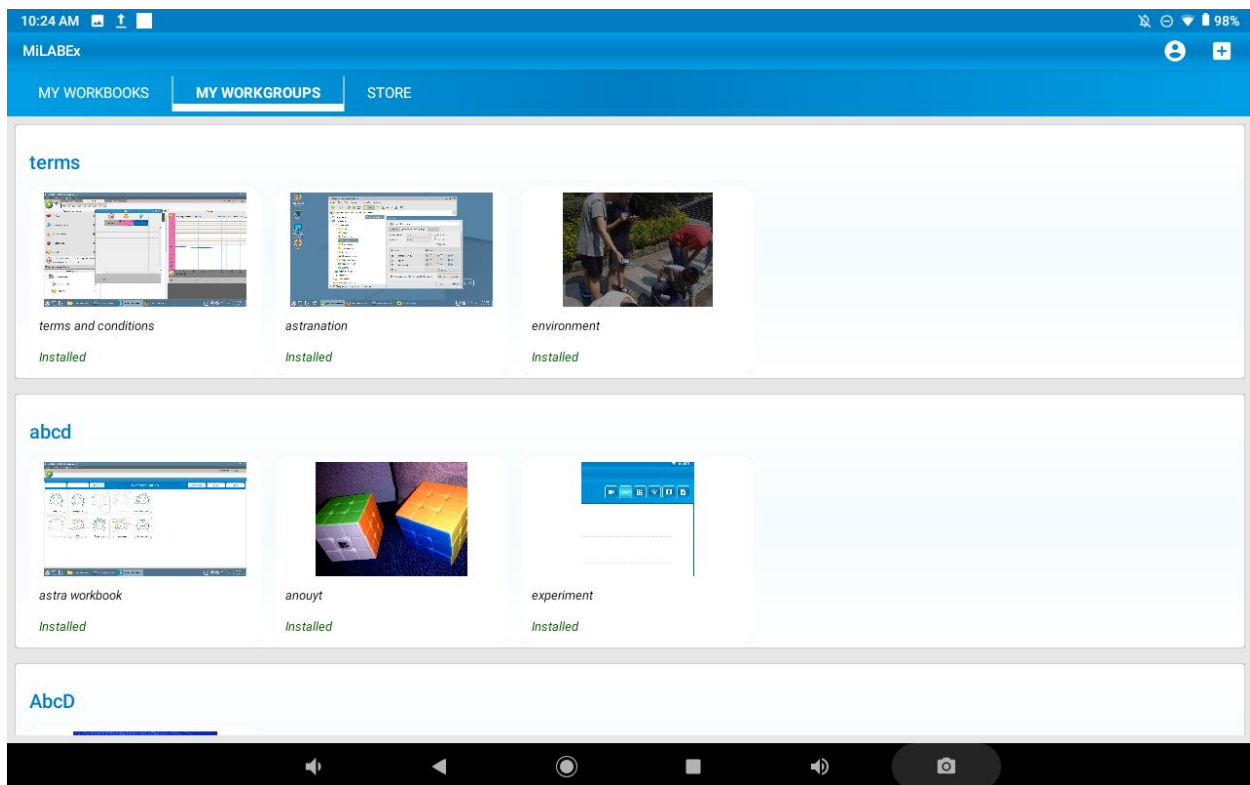
The file will be uploaded according to your selection in the Properties Tab.

- Public store: Upload your workbook to the public store where it can be accessed by any einstein™ user. All store workbooks must be reviewed and approved by the einstein™ team before they appear in the store.
- Workgroups: Workgroups are a great option for teachers who want to share their workbooks only with a specific group of students or peers. When adding workbooks to workgroups, they are not reviewed by einstein™ and will not appear in the public store.

When you're done, a popup will inform you that the workbook has been uploaded. Tap Close to close the notification.



Once completed, you'll find your workbook in the **My Workbooks** tab.




Step 9: Run Experiment

First tap on the Workgroup you want to open and run an experiment

Workbooks in Review

Before a workbook can appear in the **Store**, it must be reviewed and approved by the Einstein World team. Once a workbook has been reviewed, you'll receive an email informing you if it is approved, not approved, or if amendments are required.

Transferring Approved Workbooks from the Store to My Workbooks

All approved public workbooks (yours and those created by other users) can be viewed in the store. Simply tap the workbook you'd like to install, and a popup will appear with more information about the workbook's category, author, title, and description. Tap **install** to add it to **My Workbooks** where you can tap the workbook again to open it. Once opened, tap the **Run** button () at the bottom right to run the experiment in the workbook. The default view is graph. During the experiment you can choose to add or change your data views. For more information visit [Data Views](#).

Accessing a Workgroup by ID

Students and peers can access workbooks shared with a specific workgroup by using the workgroup ID. Click **Workbooks** on the main app screen



and enter the workgroup ID you received:



Start an experiment

MiLABEx

OR

Workgroup ID

Submit

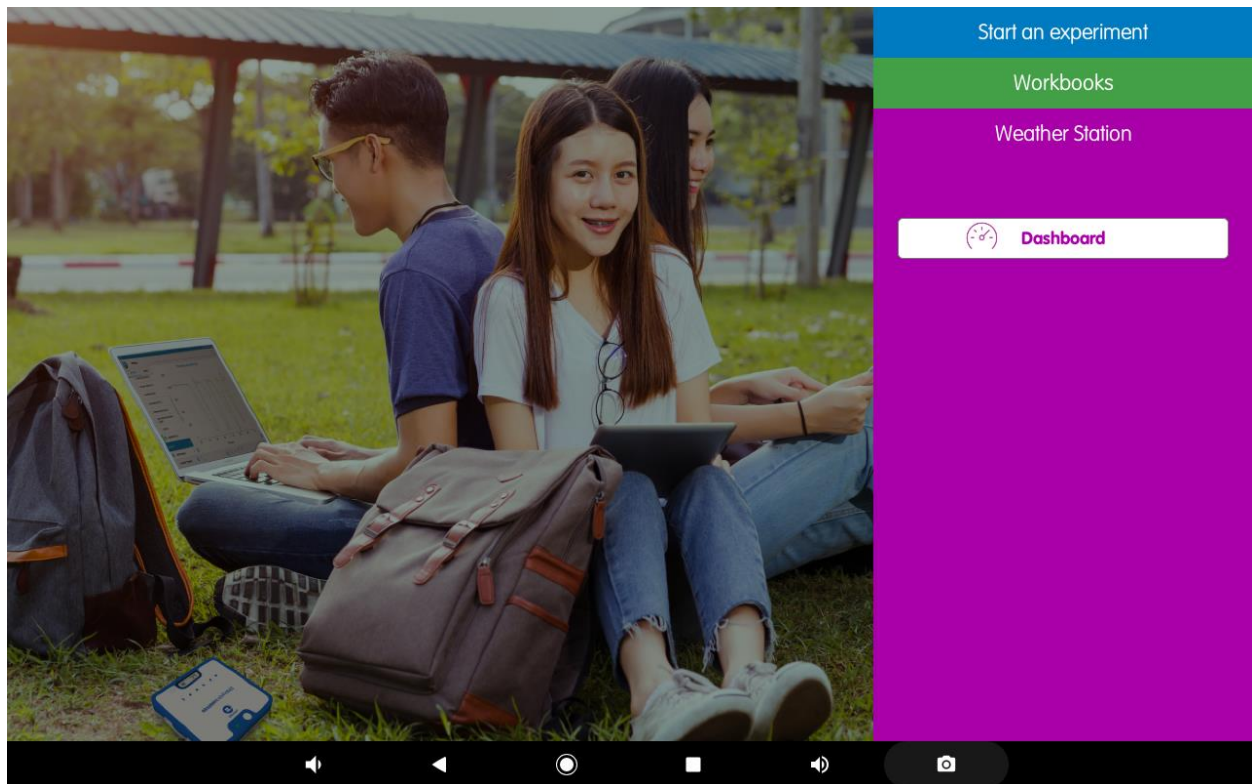
Weather Station

Navigate the Weather Station

The “Weather Station” is a dashboard that shows weather related sensors. Its main purpose is to enable students to visualize the current weather status with chosen parameters or monitor the behavior of the weather parameters for a long period of time.

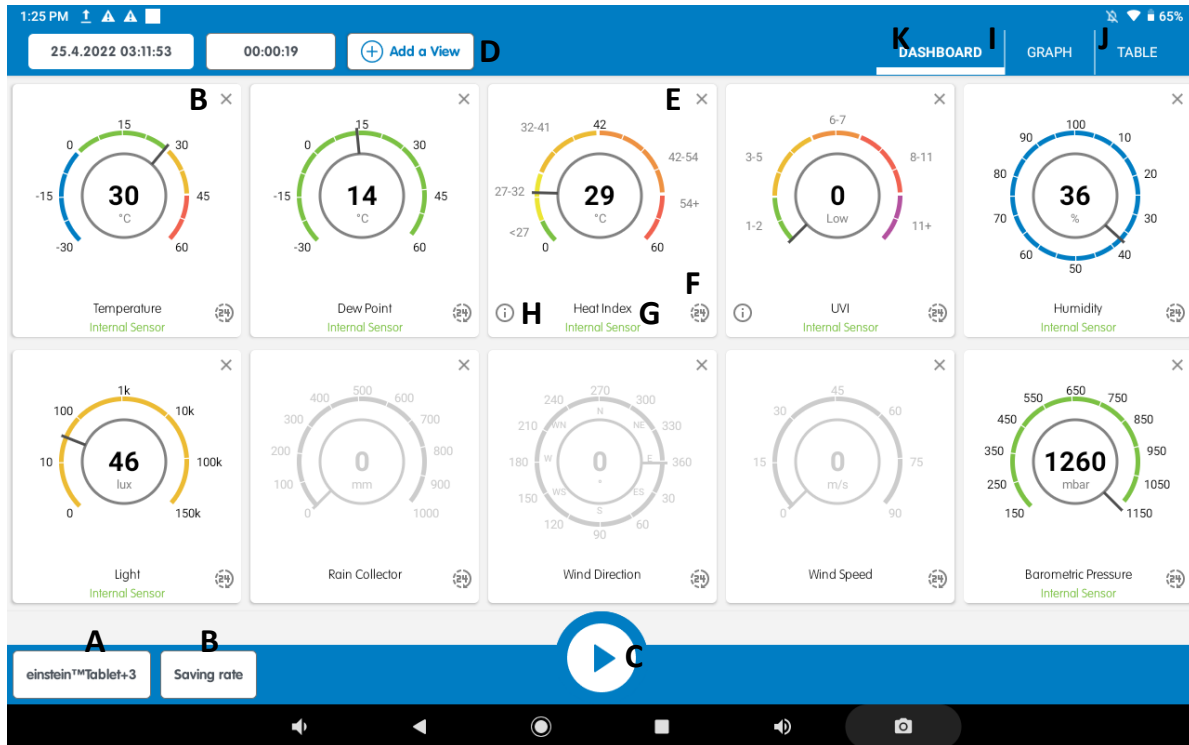
The weather station works only with einstein™ LabMatell and the einstein™ Tablet3 with firmware 4.33 and up.

Tap on Weather station tab on the landing page.



Tap on “Dashboard” to go into the weather stations’ Dashboard.

The “DASHBOARD” -is the page displayed when you open the “Weather Station”. It is composed of tiles that display the “current” state of the different sensors.



Each tile has displayed the default view- a clock style gauge that shows its current sensor value. When you open the “Weather Station”, it will show all the default sensors.

General Setup

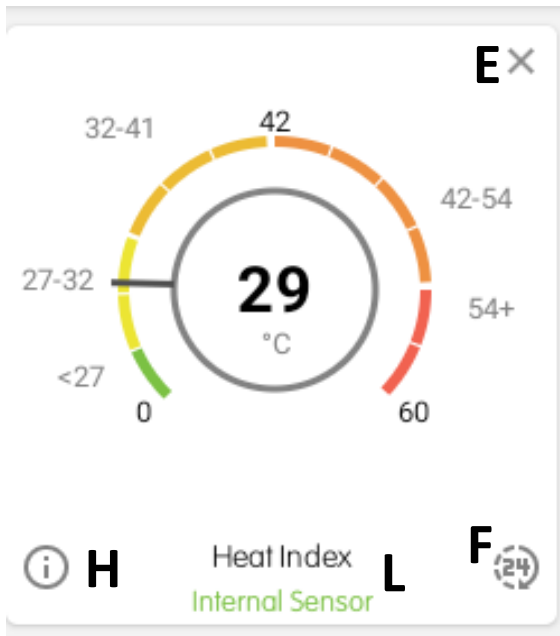
A - Logger device shows the name of the logger which the device is connected to.

B – Saving rate – here you can change the sample rate. The default sample rate is “1 sample per second”.

C - Start/Stop button

To start the measuring, click on the Start button. When you Stop it, it will save the measurements automatically. When clicking on Run again, it will reset all the station’s history and start again.

Tiles options



D - Add a tile - click on “Add View” button

E - Delete a tile - click on the X on the tile’s upper right-corner

F - Show last 24 hours graph -tap on the 24 hours icon to show a graph of the last 24 hours data

G – The name of the sensor. In case it is internal sensor, it will appear as the example shows.

H – In Heat index and UVI you will also be able to find an extra information regarding the measurement

The View Mode tabs

I - Click on “GRAPHS” to the history (since the last “Run” command).

J - Click on “TABLE” to show the history in a table format.

K - Click on “DASHBOARD” to the dashboard view.