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The Education Source for Software & Technology Products

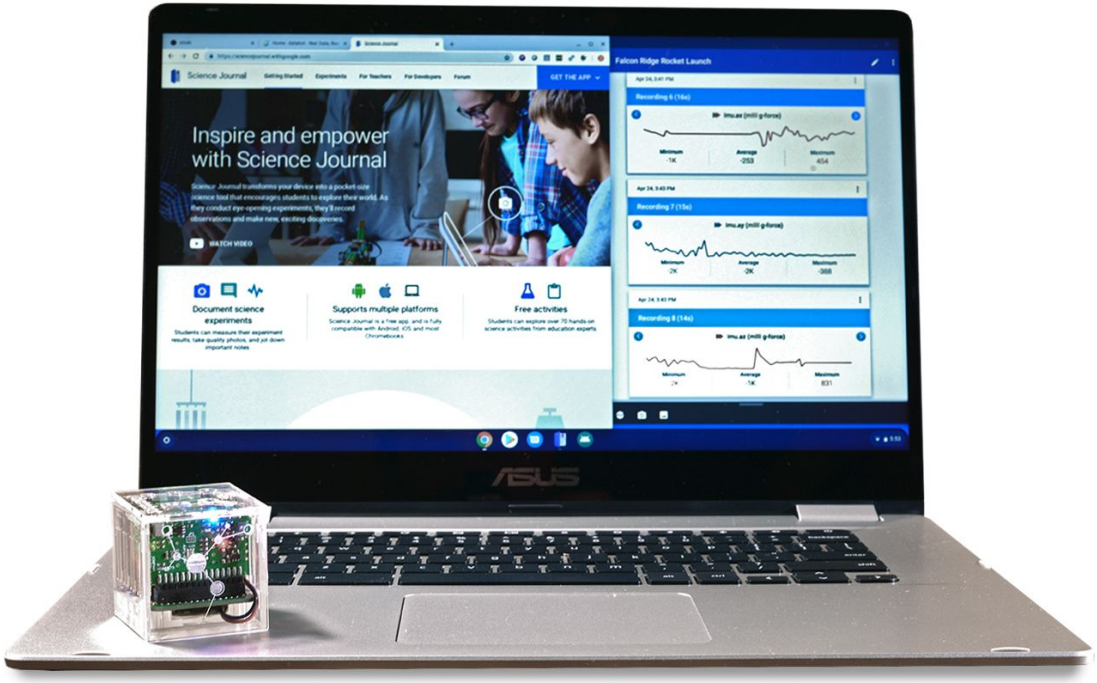
Energize Lessons with databot™ & Chromebook Science

chromebook

WORKS WITH Science Journal an initiative by Google

databot™

One little cube... *Science on the move.*



Energize Lessons with databot^{tm} & Chromebook Science

Your Presenter: Robert Grover

Robert Grover began his STEM education career in 1988 teaching LEGO engineering, robotics, programming, digital arts, and more.

ROBERT O. GROVER
CEO, aRbotics LLC
www.databot.us.com
robert@databot.us.com

Over the past thirty years Robert has worked with students, teachers, and administrators all over the world developing and refining solutions that make STEAM education easier, more engaging, and more effective.

Energize Lessons with databot™ & Chromebook Science

Today's Webinar

- Meet Science Journal by Google
- Meet databot™ - a wireless all-in-one sensor device
- See examples of Science Journal & databot™ working together to turn your Chromebooks into an interactive science lab.
- Q & A session
- Links and Resources for Getting Started

WORKS WITH Science Journal an initiative by Google

databot™

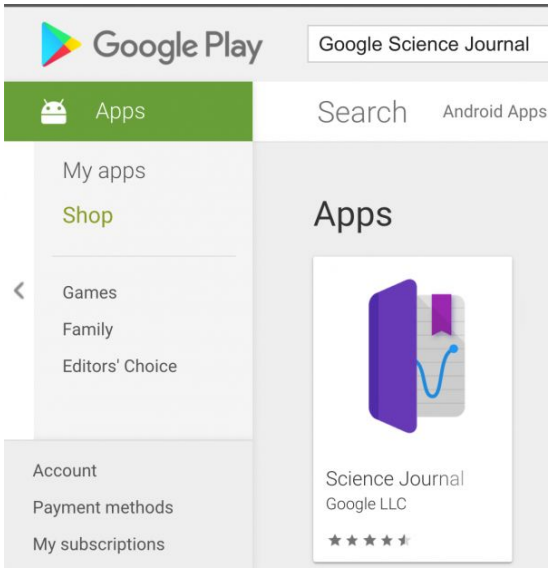
chromebook

Energize Lessons with databot^{tm} & Chromebook Science

Science Journal

What is Science Journal?

- Free App available on Android and IOS devices. We will provide links and instructions at the end of this presentation.
- Uses your internal sensors on your Chromeboook, smart device, phone, tablet, etc. PLUS it can connect to external sensors like databot^{tm}.
- Enables students to easily create a multimedia science journal comprised of written observations, data collected, and pictures.



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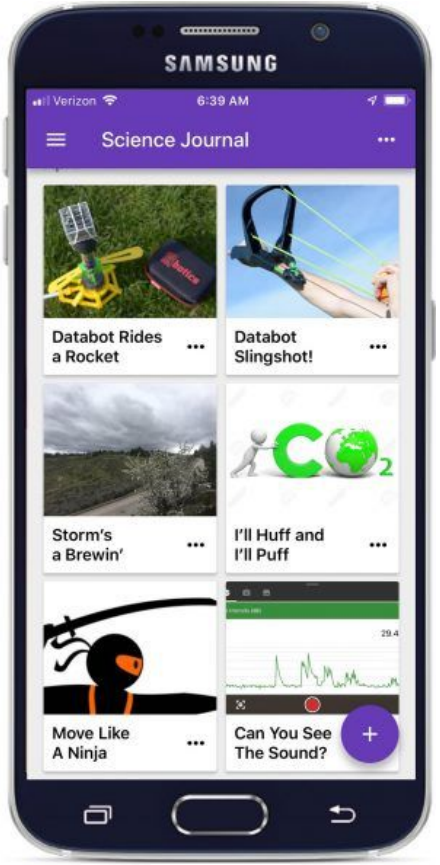
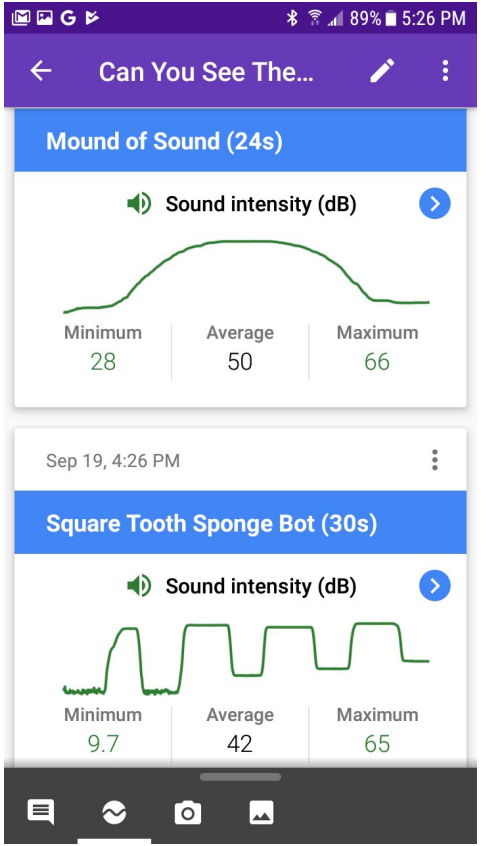
Energize Lessons with databot[tm] & Chromebook Science

WORKS WITH Science Journal an initiative by Google

- Students can build colorful, rich science journal portfolios very easily.
- Add notes, record data, take pictures or upload images.
- Syncs with Google Drive - across multiple devices.
- Requires Android Play Store to be enabled on Chromebooks. Your School IT personnel can activate.





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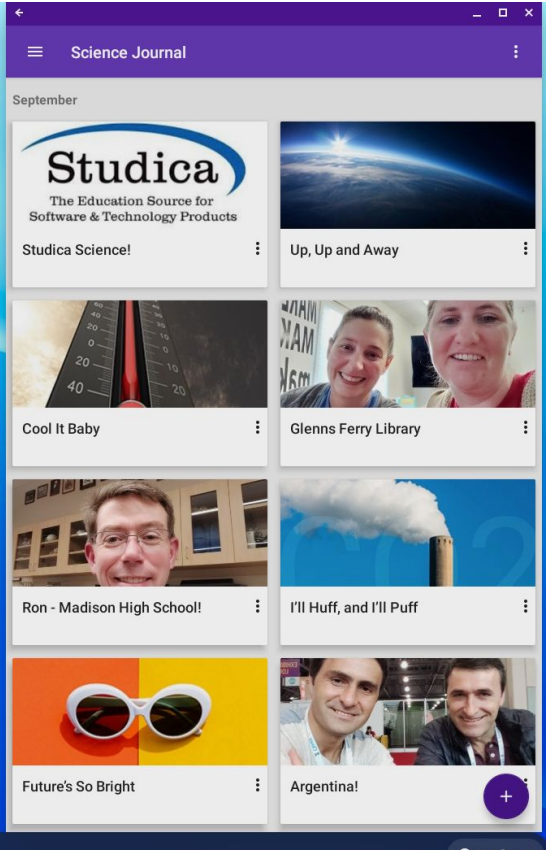
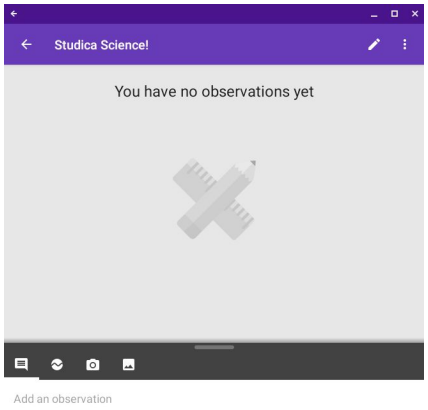
Screen capture of my Google Science Journal on an Asus Chromebook.

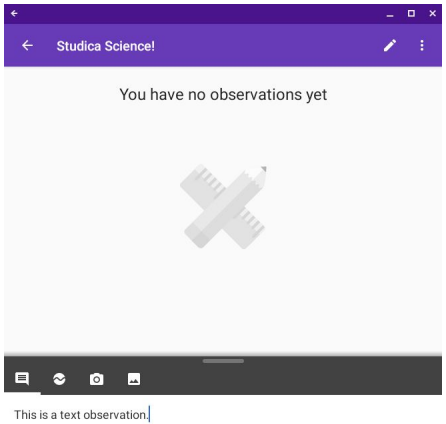
- Each “experiment” becomes an entry in the journal and you can add pictures to represent the experiment.
- This portfolio syncs with your Google account and updates across all devices as it grows.
- Create new experiments by selecting the + sign.



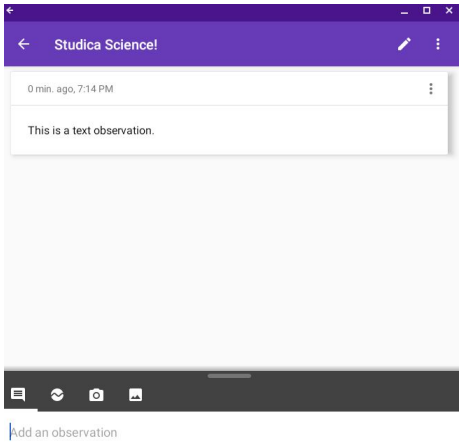
Energize Lessons with databot™ & Chromebook Science



New experiment with no observations



Select text observation & hit blue arrow to publish.



Observation is added to the experiment (sequentially).

Process of creating a new experiment: 4 Types of observations you can add to your experiment: 1) Text, shown here; 2) data; 3) capture a picture with your camera; 4) upload a screen capture.

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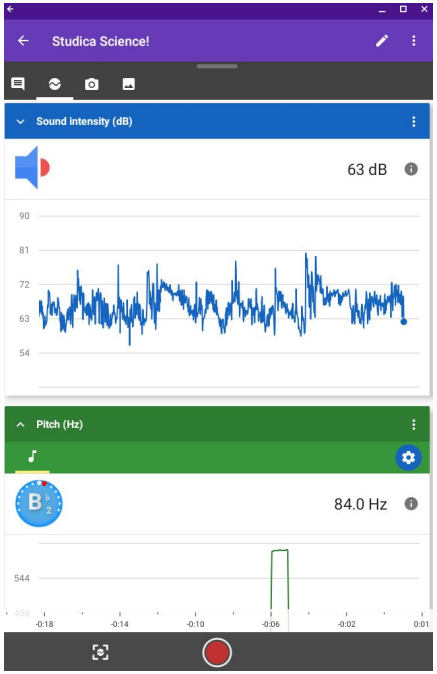
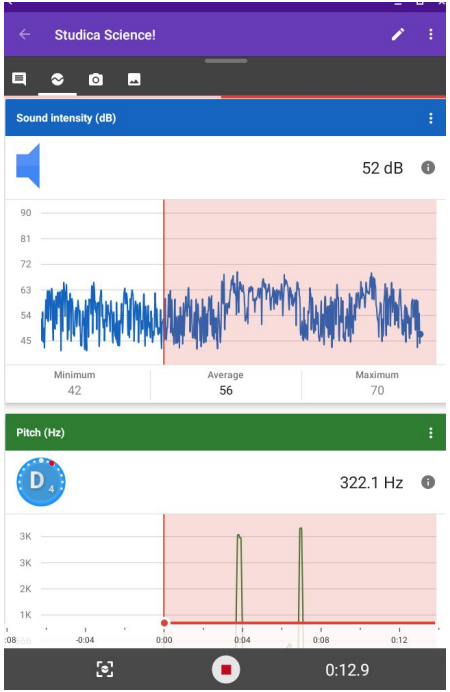


Display sensors.

Click Record.



Stop recording and data is added to the observations in this experiment.

Process of capturing data as an observation. Shown here, internal sensor on my Chromebook is by default displayed when you select the data observation icon (sound is the only sensor on a Chromebook typically).

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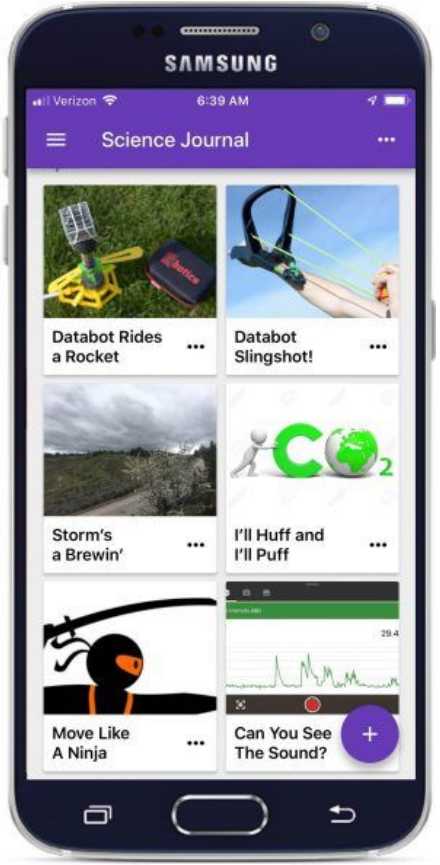
Energize Lessons with databot[tm] & Chromebook Science

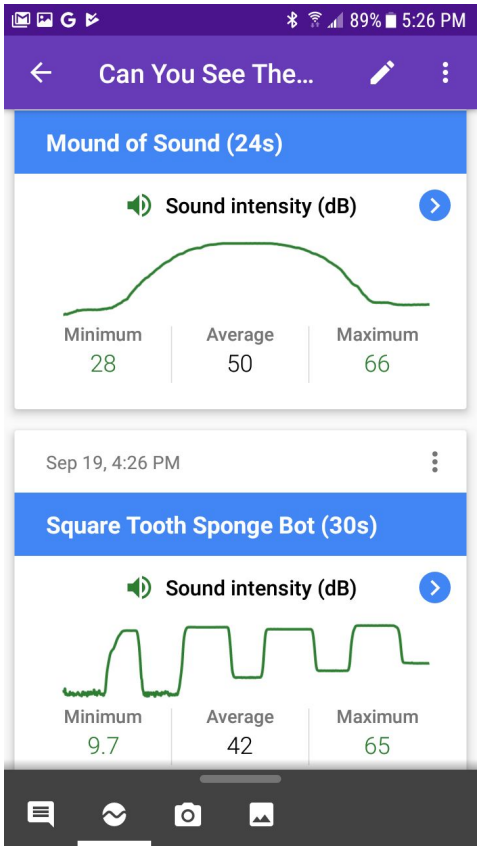
WORKS WITH Science Journal an initiative by Google

QUICK REVIEW!

- Students can build colorful, rich science journal portfolios very easily.
- Add notes, record data, take pictures or upload images.
- Syncs with Google Drive - across multiple devices. CSV files of data can also be easily exported.

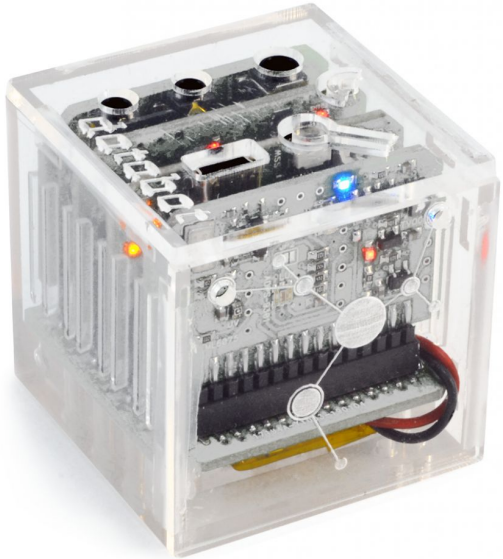
EASY!





Energize Lessons with databot^{tm} & Chromebook Science

Now let's add in databot^{tm}!!



databot^{tm} is a low-cost, friendly and engaging data logger that combines 10 internal sensors, 1 external temperature probe, an internal SD card memory, and Bluetooth low energy wireless to provide a simple way to collect data for programs like Google Science Journal!

- External Temperature Probe
- Humidity
- UVa, UVb and UV Index
- Ambient Light
- CO2 & VOC
- Altimeter
- Accelerometer
- Gyroscope
- Magnetometer
- Sound
- Air Pressure

databot^{tm} fits in the palm of your hand, is rechargeable, wireless, and inexpensive to bring data exploration to your classroom in a fun and painless way.

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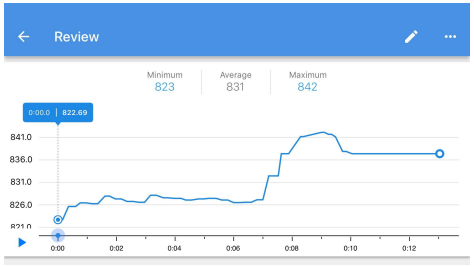
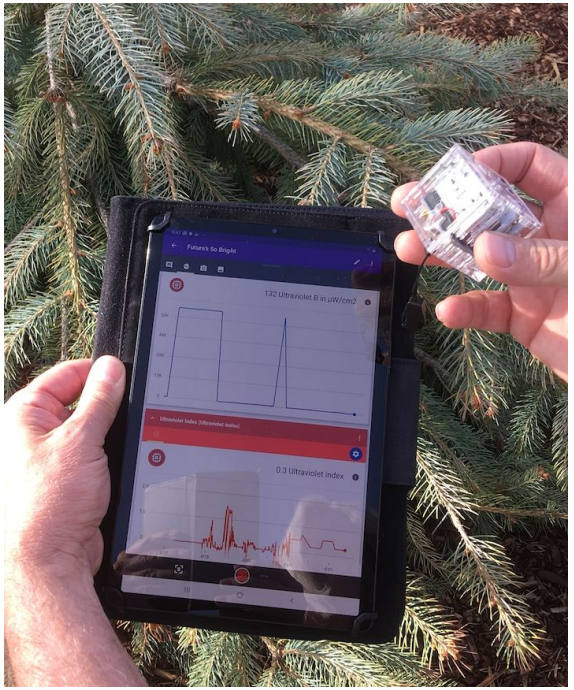
Chromebook Rocket Launch



Simple, Wireless Data Collection



One little cube. Science on the move!

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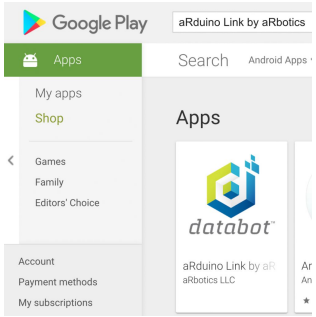
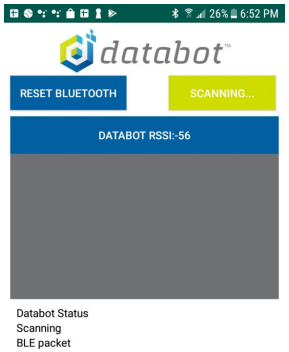
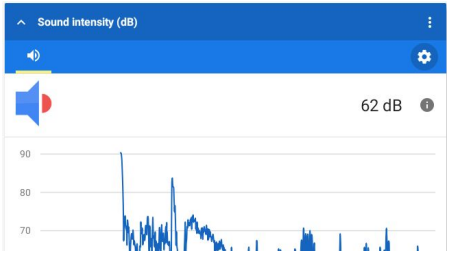
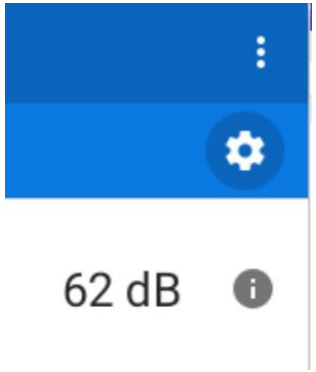




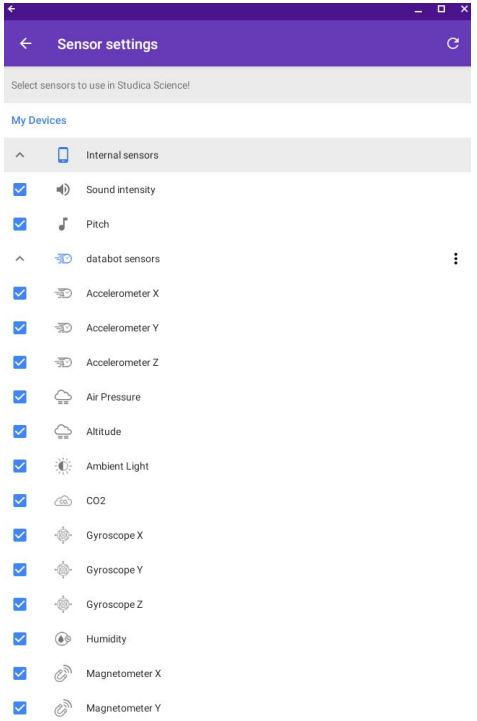
1) Install aRduino Link from the Play Store & connect to databot^{tm}





2) Go to Science Journal Sensor settings;

3) Select databot^{tm} sensors and begin collecting data!



How to access databot^{tm} sensors within Science Journal.

version 1.07

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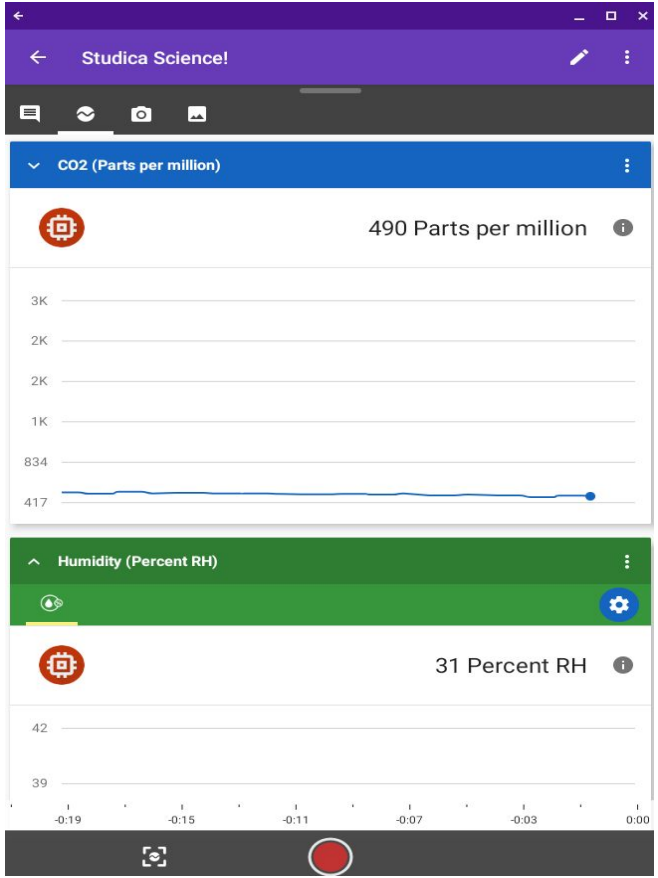
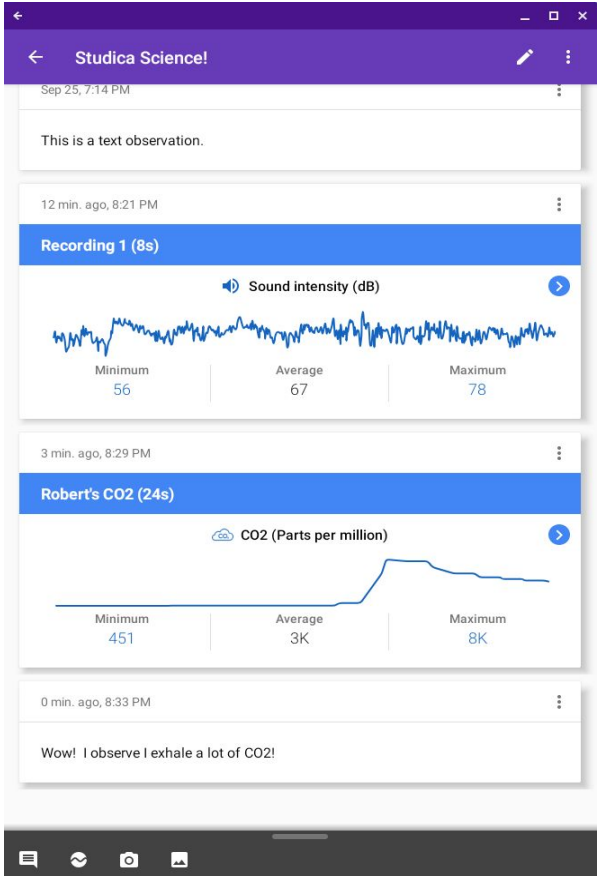
Energize Lessons with databot[tm] & Chromebook Science

Simple Trial Experiment to Introduce SJ & databot[tm]

- Set to display CO2 and Humidity levels.
- Challenge students to produce the highest level of CO2.
- Note the changes in CO2 levels and humidity as students breathe.





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Energize Lessons with databot^{tm} & Chromebook Science

Overview

Students use data and test different sunscreen products to determine the relationship between sun exposure and SPF rating. Students are challenged to design an improved sunscreen product based on their understanding.

Materials (databot+GSJ)

1 - piece of transparent plastic or glass that you will place in front of the databot UV sensor

4 or more sunscreen products with a range of SPF values. Try to select products that increase SPF in equal increments to make comparison of results easier.
Cotton balls and card stock for applying the product evenly

UV Experiment with SJ & databot^{tm}

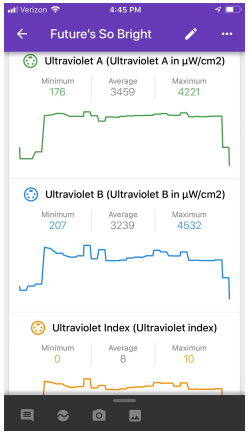
Activity

Have students present their hypotheses of what will happen when SPF of different values is applied to the cover glass.

-- will the UV data display change with the application of SPF?
-- will both UVA and UVB change?
-- will the change in data correlate easily to the SPF factor? e.g. 2x, 4x

Systematically Test the SPF results

Propose Improved Design for Protection based on results



NGSS Performance Expectation

MS-ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem. (Grades 6 - 8)

Do you agree with this alignment?

This activity focuses on the following Three Dimensional Learning aspects of NGSS:

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. Alignment agreement:	• There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. Alignment agreement:	

View other curriculum aligned to this performance expectation

NGSS Practice 4 Analyzing and Interpreting Data

See the Full Appendix of NGSS Practices:

https://www.nextgenscience.org/sites/default/files/Appendix%20F%20%20Science%20and%20Engineering%20Practices%20in%20the%20NGSS%20-%20FINAL%20060513.pdf

NEXT GENERATION SCIENCE STANDARDS
For States, By States

Practice 4 Analyzing and Interpreting Data

> *Once collected, data must be presented in a form that can reveal any patterns and relationships and that allows results to be communicated to others. Because raw data as such have little meaning, a major practice of scientists is to organize and interpret data through tabulating, graphing, or statistical analysis. Such analysis can bring out the meaning of data—and their relevance—so that they may be used as evidence.*
>
> *Engineers, too, make decisions based on evidence that a given design will work; they rarely rely on trial and error. Engineers often analyze a design by creating a model or prototype and collecting extensive data on how it performs, including under extreme conditions. Analysis of this kind of data not only informs design decisions and enables the prediction or assessment of performance but also helps define or clarify problems, determine economic feasibility, evaluate alternatives, and investigate failures.* (NRC Framework, 2012, p. 61-62)

As students mature, they are expected to expand their capabilities to use a range of tools for tabulation, graphical representation, visualization, and statistical analysis. Students are also expected to improve their abilities to interpret data by identifying significant features and patterns, use mathematics to represent relationships between variables, and take into account sources of error. When possible and feasible, students should use digital tools to analyze and interpret data. Whether analyzing data for the purpose of science or engineering, it is important students present data as evidence to support their conclusions.

ISTE Standards

Knowledge Constructor:

Students critically curate a variety of resources using digital tools to construct knowledge, produce creative artifacts and make meaningful learning experiences for themselves and others.

➢ 3a - Students plan and employ effective research strategies to locate information and other resources for their intellectual or creative pursuits.

➢ 3b - Students evaluate the accuracy, perspective, credibility and relevance of information, media, data or other resources.

➢ 3c - Students curate information from digital resources using a variety of tools and methods to create collections of artifacts that demonstrate meaningful connections or conclusions.

➢ 3d - Students build knowledge by actively exploring real-world issues and problems, developing ideas and theories and pursuing answers and solutions.

One More Activity - the Data Game!

Overview

Introduce students to decibels as a unit of measurement of sound that describes “sound intensity” - what we know as “loudness.”

Students experiment with the microphone on their Chromebook using Science Journal.

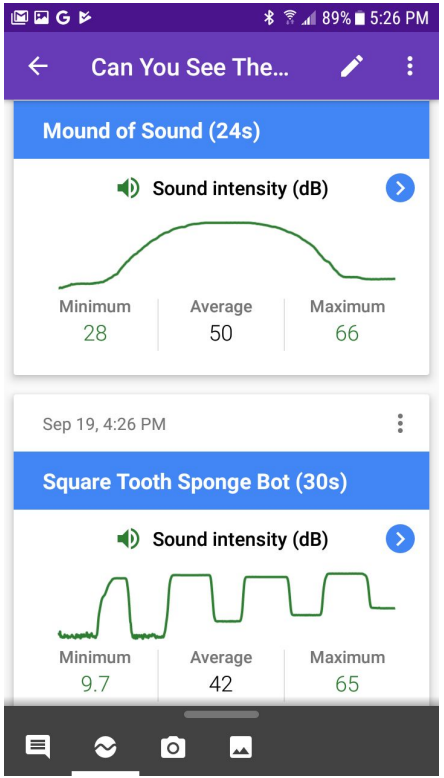
Students play the data game.

Challenge 2 - Etch a Sketch with Sound!

Experiment with your sound levels and watch the image that is generated by the graphic display. Can you draw the following shapes with sound?

1. A round mound.
2. A square.
3. Can you do a triangle?

Work with a friend to record your best efforts and share them with your class. Which shape is toughest to produce and why?
Using your new found sound skills, can you create an image using just sound that is recognizable to others with no explanation?



Thanks for Attending!
Time for Q & A!!

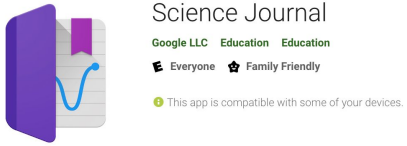
Presentation Appendix *(PDF will be shared)*

1. Google Science Journal - where to get it.
2. databot[tm] Kit contents and configurations
3. Databot Sensor specifications and data sheets
4. Using databot with other software

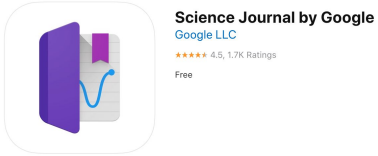
Where to Get Google Science Journal

Official Website

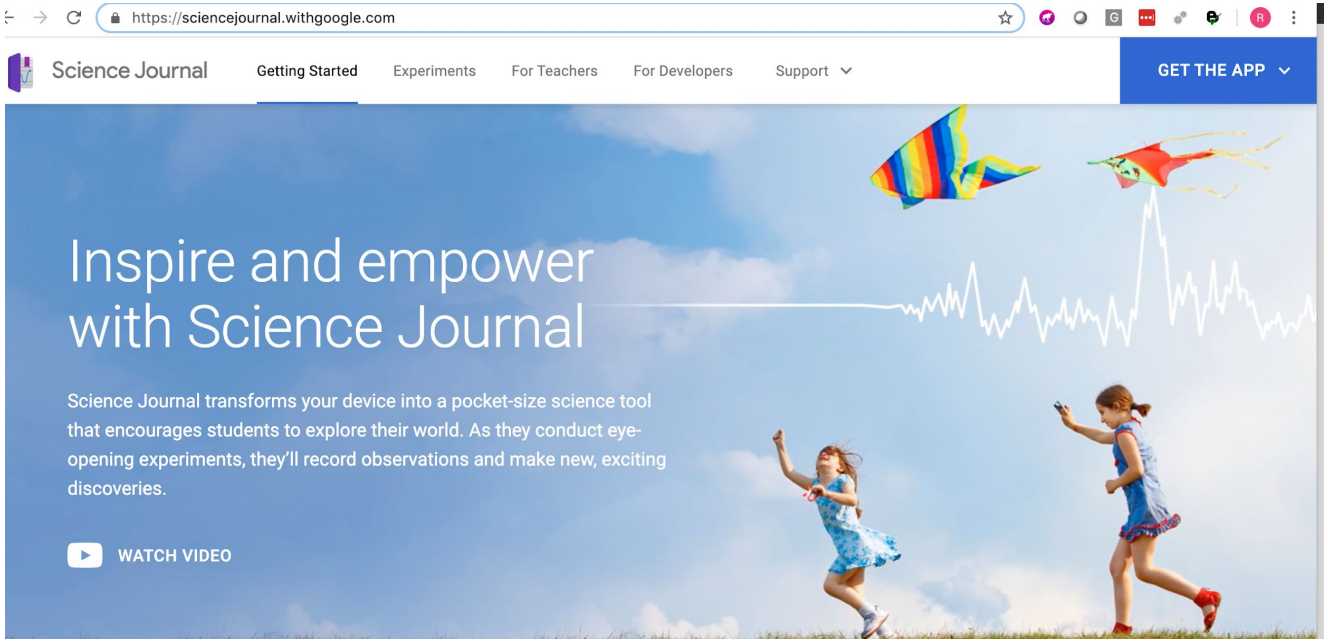
https://sciencejournal.withgoogle.com/



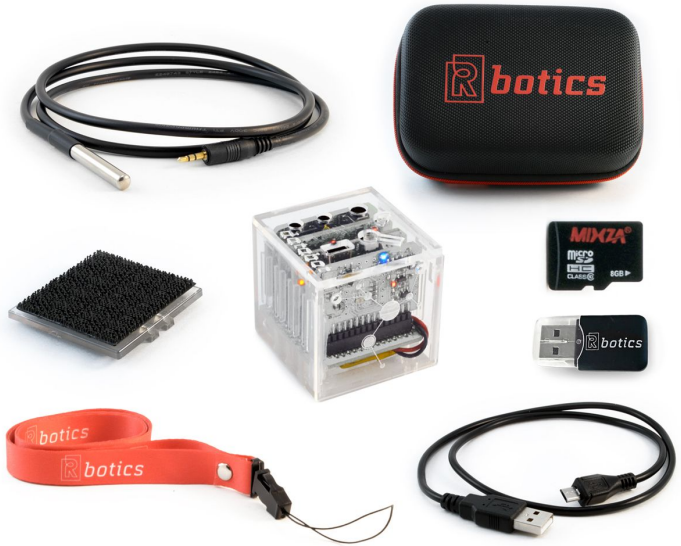
Android Play Store



IOS App Store



Product Information - databot^{tm}



- Soft Case
- Mini USB for charging and programming
- Velcro Plate for Attachments
- External Temperature Probe
- Lanyard
- 8GB Micro SD Card and Reader
- databot^{tm}

databot[tm] Purchase Configurations

databot™ Single – The Classic

☆☆☆☆☆

$179.99

Add to cart

databot™ 2 Pack – Twice the Fun!

☆☆☆☆☆

$350.00

Add to cart

ClassPack 10 – the Big Enchilada!

☆☆☆☆☆

$1,750.00

Add to cart

databot[tm] Technical Info

Sensors

I2CMPU-9250I2C: Inertial Measurement Unit (IMU) includes Accelerometer, Magnetometer, Gyro.
MPL-3115A2I2C: Precision Altimeter for Air Pressure, Altitude, Temperature.
SGP-30: Sensiron Gas Platform for CO2/VOCs.
SHTC3: Sensiron Digital Humidity Sensor for Humidity and Ambient Temperature.
VEML-6075: Ultraviolet Sensor for UVA and UVB.
ADMP-401: Omnidirectional Microphone for Sound.
APDS-9301: Miniature Ambient Light Photosensor for Light (lux).

Data

MicroSD Writer: Internal MicroSD Card Writer for Data Storage.
HM19 BLE Module: Bluetooth Low Energy Module for Wireless Communications.
External Ports
DS18B20: Dedicated 2.5mm Stereo Jack includes Waterproof Temperature Probe.
2.5mm stereo port: Open Analog 2.5mm Stereo Jack includes Open Expansion for Analog Sensors.
I2C3.5mm stereo port: Open I2C 3.5mm Stereo Jack includes Open Expansion for I2C Devices.

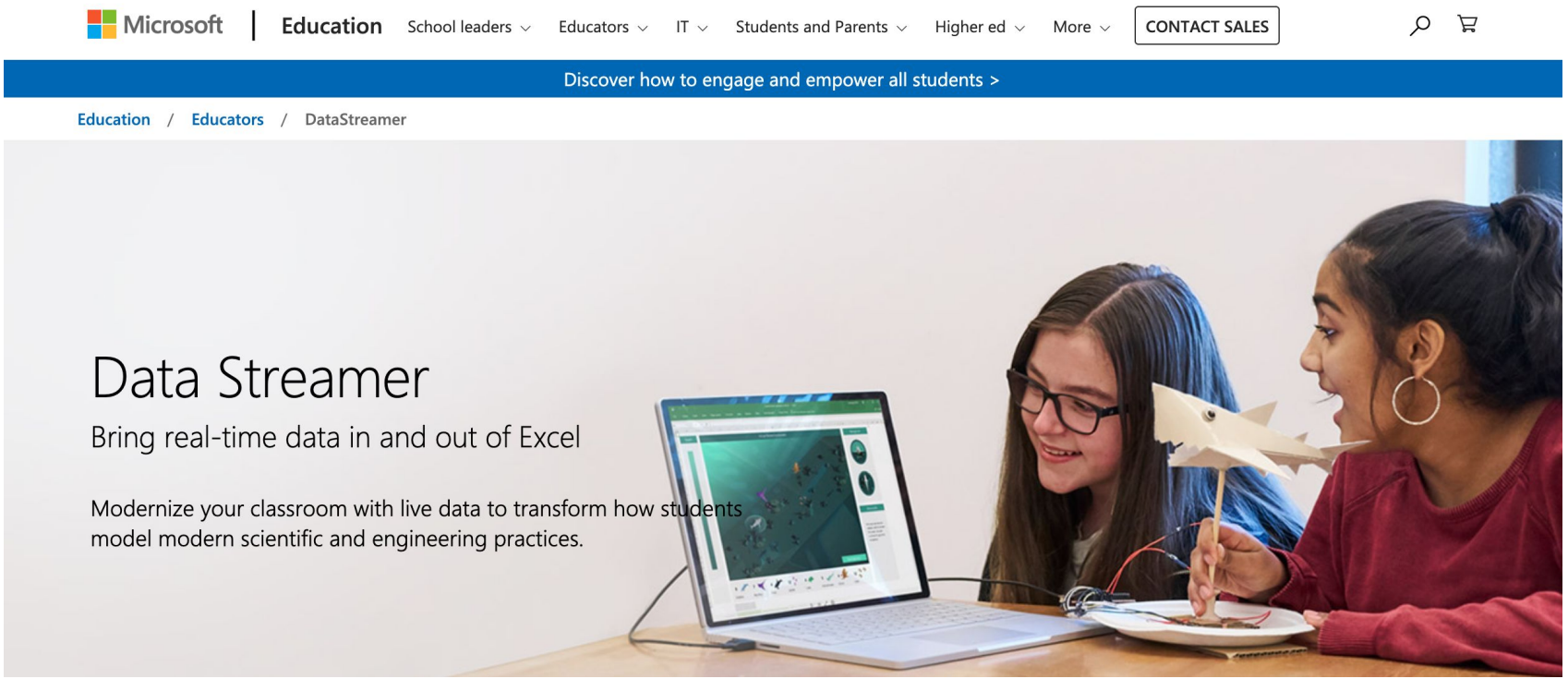
Other

BusBoard LED Strip: Programmable LED Strip includes Programmable Indicator. Address (A3)

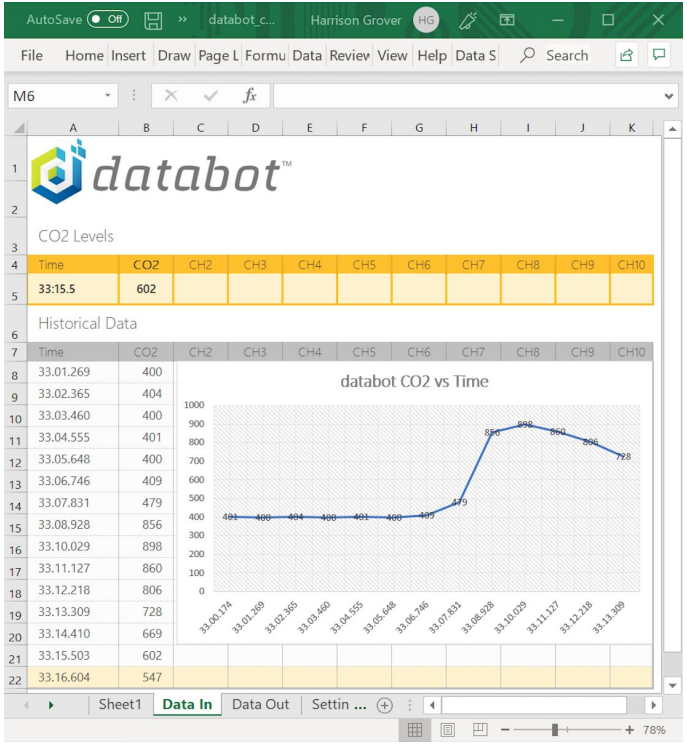
250mAh LiPo: Internal, Rechargable LiPo Battery is the Primary Power Supply. 2-4 hours.

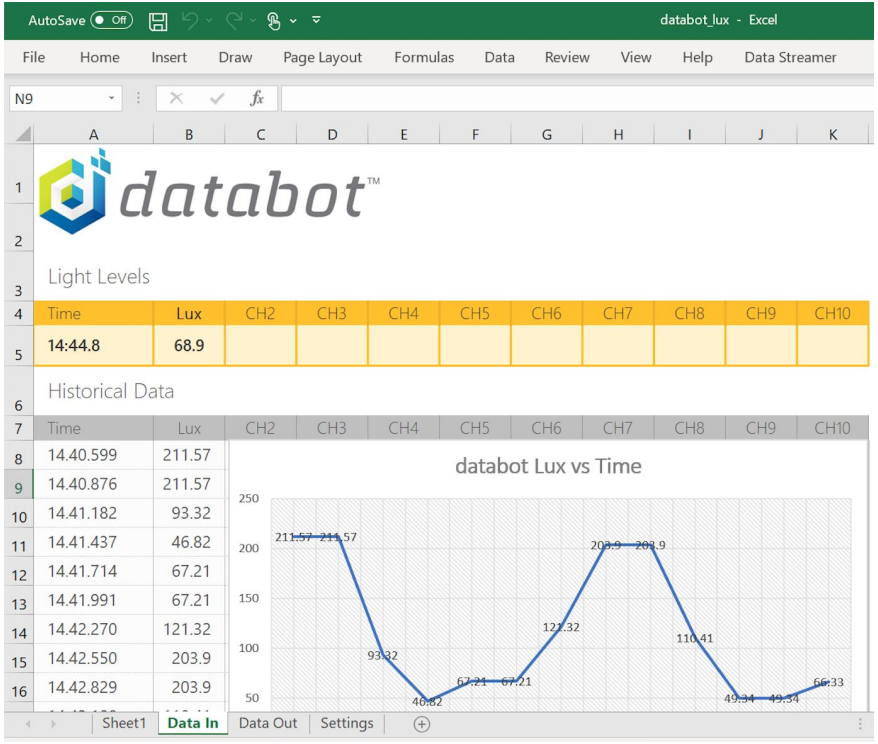
External power bank, 5v DC Micro-USB source for extended run times 24+ hours

databot[tm] and Excel - Meet Data Streamer!

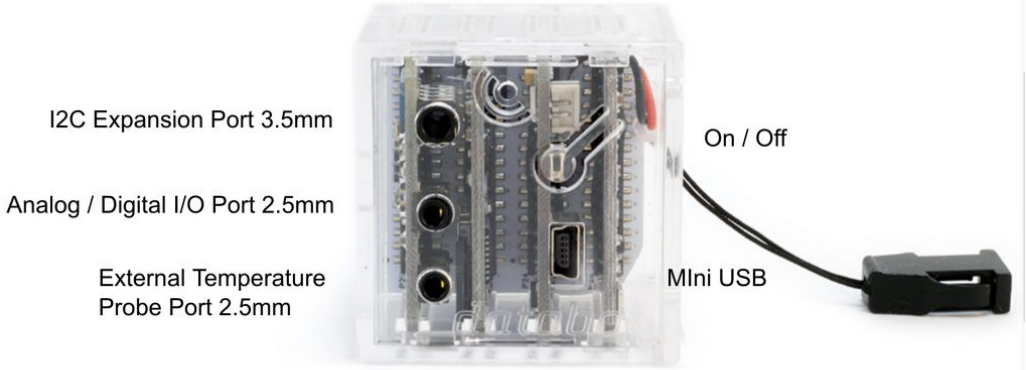


databot™ Software Examples: Excel Live Data - Data Streamer





Using databot[tm] with other software - Internal SD Card and CSV logging



Logging Data for Other Applications

Write data files to internal SD 8GB data card, use provided SD card reader to transfer to Chromebook, Windows, Mac, etc. and load into analysis programs.

NEXT STEPS

If you would like more **info**, have questions, would like to request a **quote**, or to **speak with a dedicated Educational Representative**, please contact Studica. They will be happy to assist you.

Contact Studica

Email: info@studica.com or marketing@studica.com
Call: 888-561-7521 (M-F, 9am-5pm Eastern)

Keep an eye out for a follow-up email from kristiel@studica.com.
It will include a recording of this webinar and additional info.

Thank you!

www.studica.com/databot