

Inspire Curiosity



Kiwriious

- **Background**
- **Kiwriious Science Experience**
 - **User Centred Design Process: From Mock-Up to a National Pilot**
 - **Key Takeaways From the National Pilot**
- **Kiwriious Play**
- **Future Opportunities and Challenges**

**CURIOUS
MINDS** 
HE HIHIRI I TE MAHARA



45%

Year 9 NZ students are not confident in science

49%

Year 9 teachers expressed low to medium confidence in teaching science using inquiry methods

3/4

New Zealand Primary and Intermediate schools lack effective or partially effective science programmes

Source: TIMMS, 2019

Source: NZ Curriculum 2019

A young boy with brown hair, wearing a bright yellow t-shirt and khaki pants, is crouching in a lush green field. He is holding a green magnifying glass over a small object in his hands, looking intently at it. To his left, a tan canvas bag sits on the grass. The background is a dense line of green trees under bright, natural light. The overall scene conveys a sense of curiosity and outdoor exploration.

How Do We Keep Kiwi Kids **Kiwriious**?

User Center Design Process







How Can Sarah Create New and Fun Lessons?

Limited ability to deliver “science” to kids in a fun inquiry based learning environment

“

Sheer quantity of work

“

“

Not having enough time with my students

“

“

There is not a lot of flexibility to have fun!

“

“

Lack of time to focus on teaching and learning

“

“

Finding the time because you have to push through content

“

A solution allowing
**Interactive, Collaborative
and Inquiry-Based**
science learning



The Kiwriious Science Experience

The
Kiwriious
sensors



Inquiry
Editor
Platform

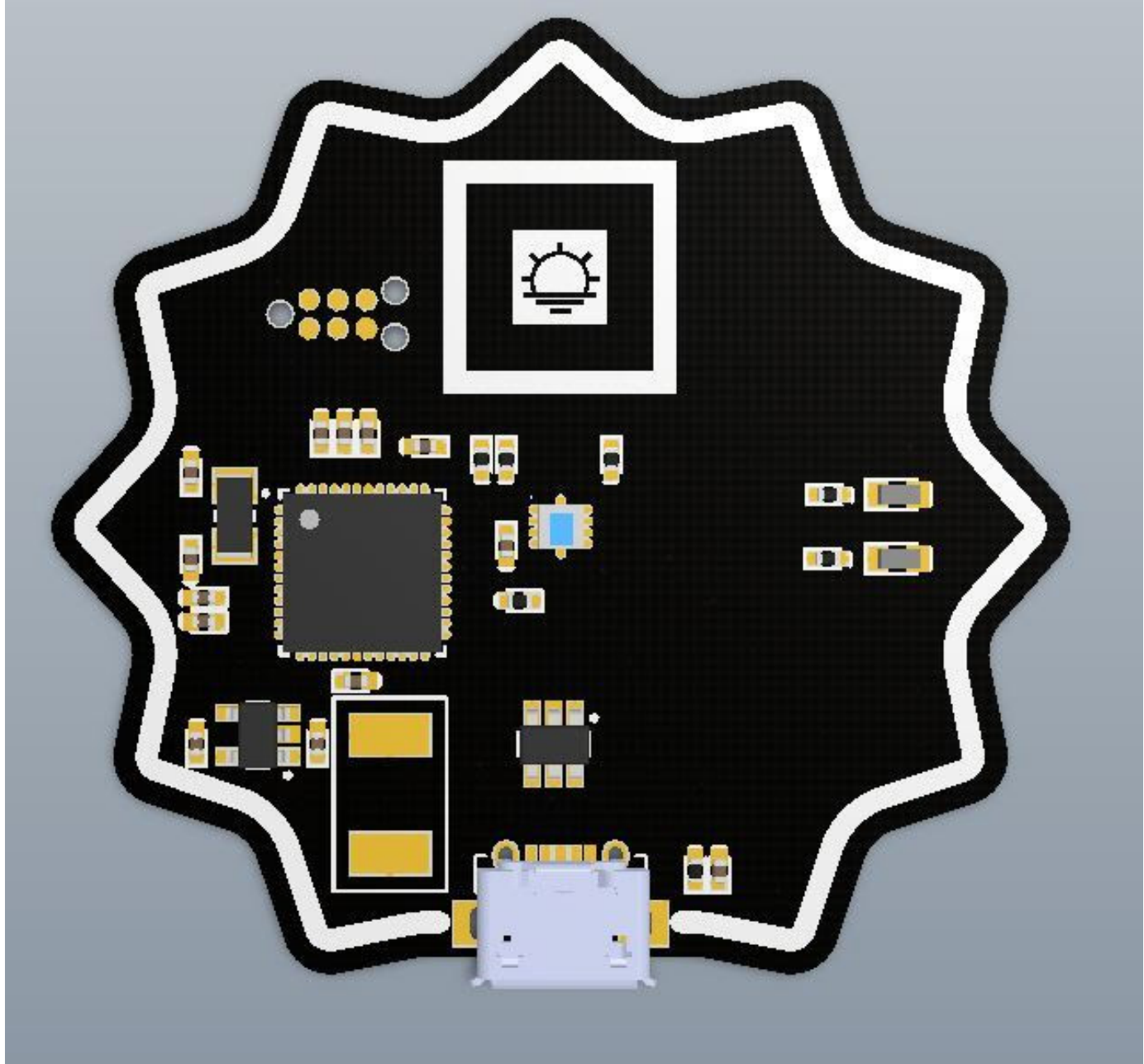
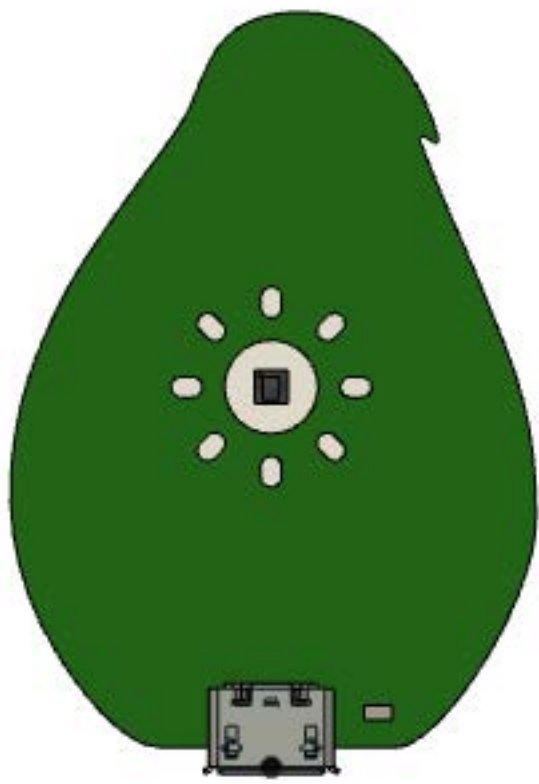
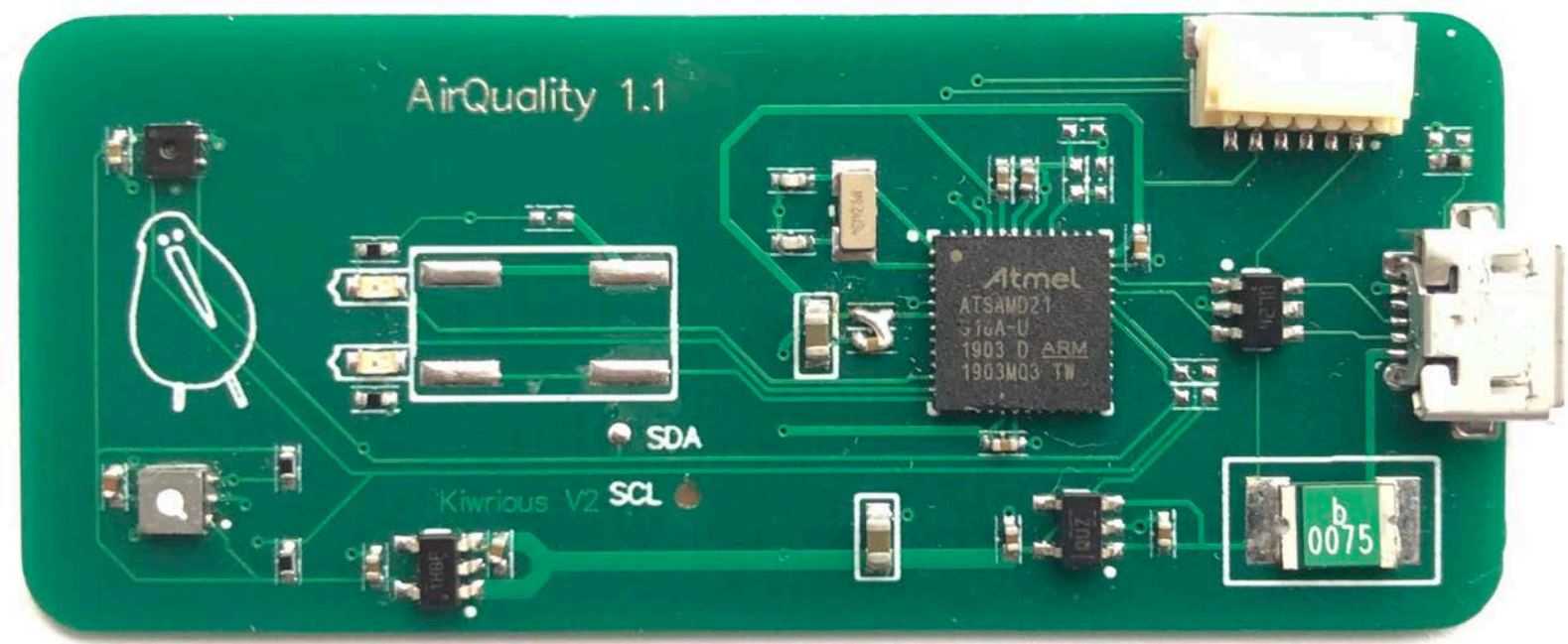


Resources
for teachers



The first integrated science learning tool to be designed in New Zealand

Aligned with the level 4 and 5 of the national curriculum.



Investigate the invisible

6 plug and play sensors make invisible natural phenomena visible encouraging students to let their innate curiosity run wild and free.





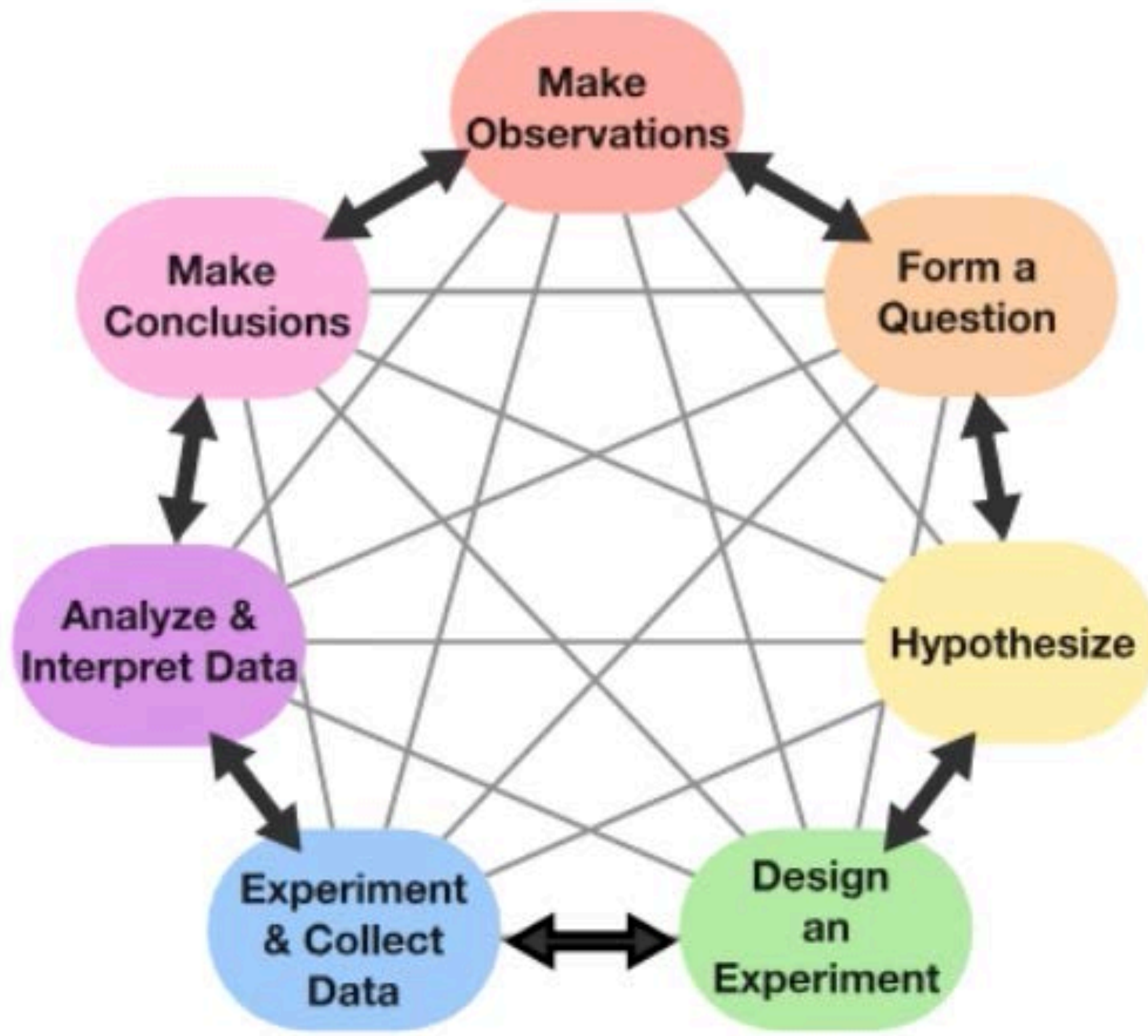
Class Kit

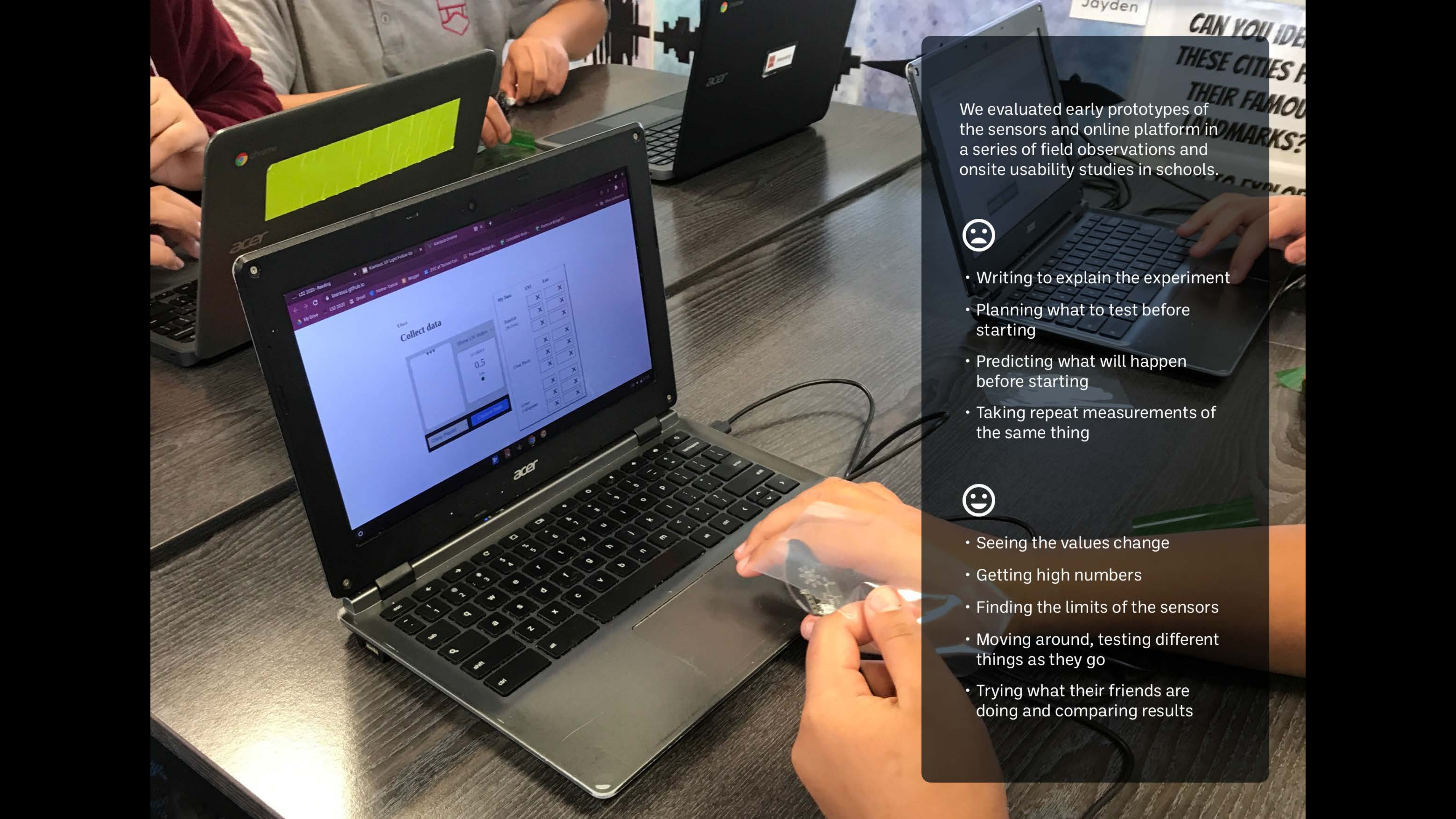


Inquiry Editor

Help students understand that science is empirical and tentative - encourage repeated observations, sharing, replication

Runs on Chrome Books



A photograph of a classroom where several students are seated at a long wooden table, working on laptops. The focus is on a laptop in the foreground displaying a data collection interface. The interface has a purple header with 'Collect data' and a central display showing a value of '0.5'. To the right, there is a table with columns for 'My Data', 'ENV', and 'Loc'. The table contains several rows of data points, some with 'X' marks. In the background, other students are visible, some with their laptops open. A sign on the wall reads 'CAN YOU IDENTIFY THESE CITIES FROM THEIR FAMOUS LANDMARKS?'. A name tag 'Jayden' is visible on the wall.

We evaluated early prototypes of the sensors and online platform in a series of field observations and onsite usability studies in schools.



- Writing to explain the experiment
- Planning what to test before starting
- Predicting what will happen before starting
- Taking repeat measurements of the same thing



- Seeing the values change
- Getting high numbers
- Finding the limits of the sensors
- Moving around, testing different things as they go
- Trying what their friends are doing and comparing results

How do children interact with a guided scientific inquiry lesson that integrates learning material directly with real-time sensor measurements?

Prediction

Observation

Explanation

IDC, 2021 (Best Short Paper Award)

Discover

Search inquiries

ALL

Challenges

My Inquiries

Tutorials

UV INDEX
9.8
VERY HIGH

21 602
LUX

Direct Sunlight

RocketScientist
UV levels in summer

871
uS

4 cm wide

KiwriousTeam
Conductive Dough

Hue **32°**

Saturation **86** %

Value **90** %

Navel Orange

DreamingUnicorn
Citrus Colours

1481
uS

Takapuna Beach

CoolBeans
Sea water conductance

HUMIDITY **82** %

26°
CELCIUS

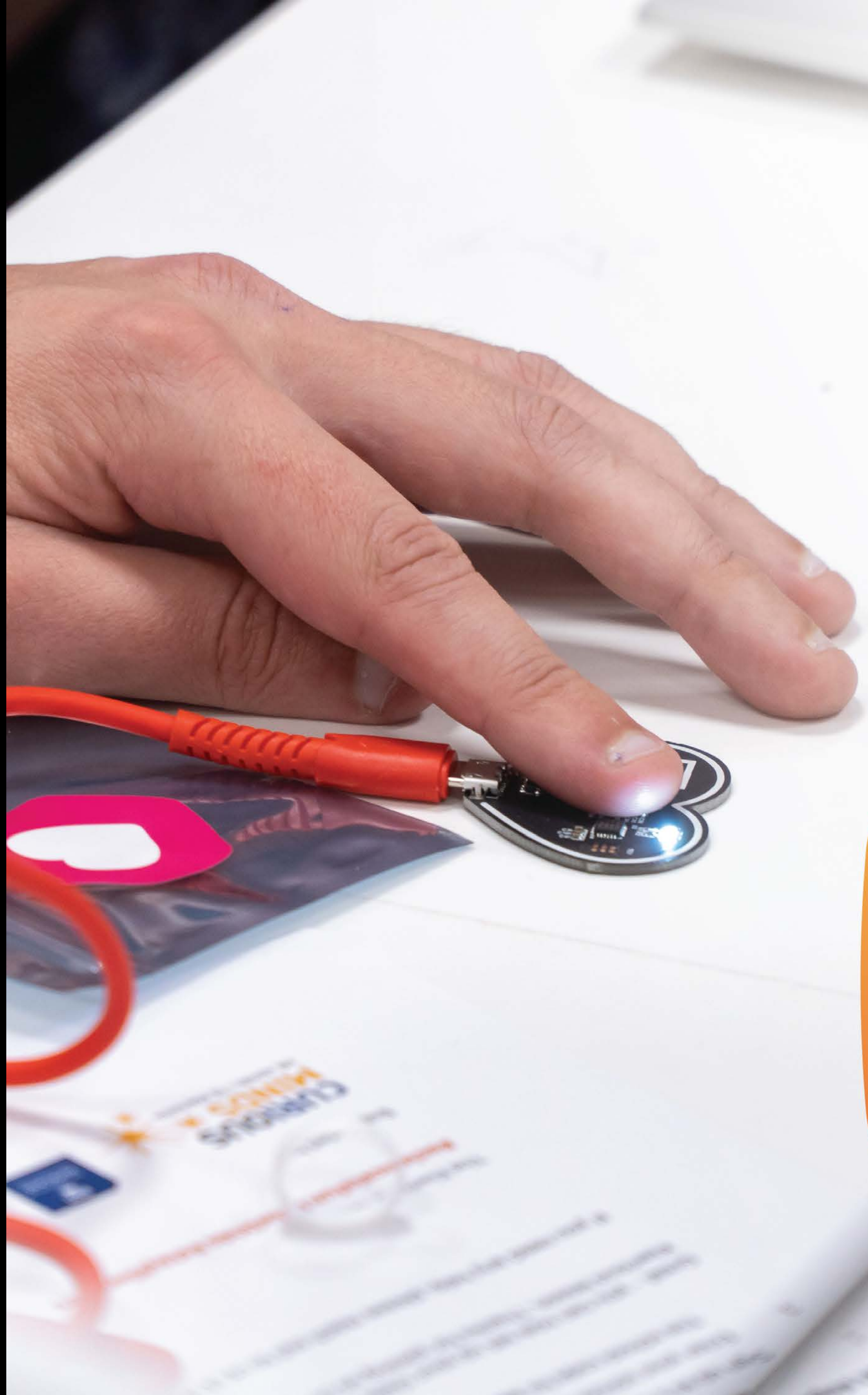
7 am

ZallyRox
Morning Dew

218
ppb

After morning chow

Tautara
My dog's breath



218
ppb

After morning chow

Tautara
My dog's breath

HUMIDITY 82%
26°C
CELSIUS

7 am

ZallyRox
Morning Dew

HEART RATE 62 bpm

Before meditation

DreamingUnicorn
Heart rate and meditation

"It is interactive for kids, it is accessible to them.. and it makes collecting data, things which can be quite strenuous normally, exciting and fun."

Alisha Smith, Kaiapoi High School

Supporting teachers

To address teachers' needs, resources and exemplar lessons aligned with the New Zealand curriculum were developed and a professional development community set up for teachers to share experiences and resources with each other.

The platform and sensors were introduced through a series of in-person and online teacher workshops, with more webinars and events scheduled to strengthen links.

“It makes me more confident to get them to try new things and go for it a bit more.”

Find and Share Resources

Lesson exemplars

Our lesson exemplars are linked to the New Zealand curriculum, and provide extra resources as well as suggestions for extensions.

- UV radiation overhead
- Humidity, food and fungi
- Stay away mosquitoes
- Perfecting the art of calm
- What's that in the water?
- Hot stuff or super cool?



Kiwrious Teachers' Community - PDC

Private group · 37 members



+ Invite

About Discussion Rooms Topics Members Media

What's on your mind?

Live Video Photo/Video Poll

New Activity

Dawn Garbett shared a link.

PDC Zoom meeting Catch up. Monday 2 August 3.15pm (for a 3.30 start). We will give you a summary of your students' views about scientific inquiry before you started using Kiwrious. We will share some of the successes and challenges to date and let you know

About

Kiwrious is launching our class kits in New Zealand. This forum is for you to share your learnings with your peers. Feel free to post any obser... See More

Private Only members can see who's in the group and what they post.

Visible Anyone can find this group.

General



4200

Kiwrious sensors deployed

35

schools using Kiwrious across a range of deciles

488+

inquiries saved or published by students and growing daily





RESPONSIBLE for YOU

LIFE KEYS

thinking

relating to others

language, symbols, text

managing self

participating & contributing

Oh, The Places You'll Go!

A display featuring circular photos of students and handwritten notes. The notes include phrases like "I'll Alone!", "I don't choose to be here", and "Everyone has their own path".

The 8 Science Capabilities

- Gether & Interpret Data
- Use Evidence
- Critique Evidence
- Interpret Representations
- Engage with Science

Interpret Representations

Students represent their ideas in various ways, including models, charts, diagrams and written text.

Changing the way science is taught

“Even the most reluctant students will go and find a chromebook from a friend, or borrow one just so they can use the sensors.”

“It’s made my class very cool”

“There’s a level for everybody... there’s room to be on any level and still be successful.”

Kiwriious Play

Kiwriious

- Motion
- Looks
- Sound
- Events
- Control
- Sensing
- Operators
- Variables
- My Blocks
- Kiwriious

Connect
Read Forever
Freeze Reading
Unfreeze Reading
sensor > 0
is sensor increasing ?
Humidity (%)
Temperature (°C)
Resistance (Ω)
Conductance (μS)
Lux

```

when clicked
  Connect
  Read Forever

when clicked
  forever
    if Lux < 10 then
      Hunt
    else
      Sleep

define Sleep
  switch costume to Sleeping
  think zzz
  repeat until Lux < 10
    glide 0.5 secs to x: 0 y: -42
    change size by 1
    glide 0.5 secs to x: 0 y: -40
    change size by -1

define Hunt
  switch costume to yawn
  wait 0.2 seconds
  think Time to get food!
  repeat until Lux > 10
    switch costume to Flying1
    wait 0.2 seconds
    switch costume to Flying2
    glide 0.2 secs to x: pick random 1 to 5 y: pick random -40 to 40
  
```

Kiwriious: Lux Not Connected



Sprite: Bat

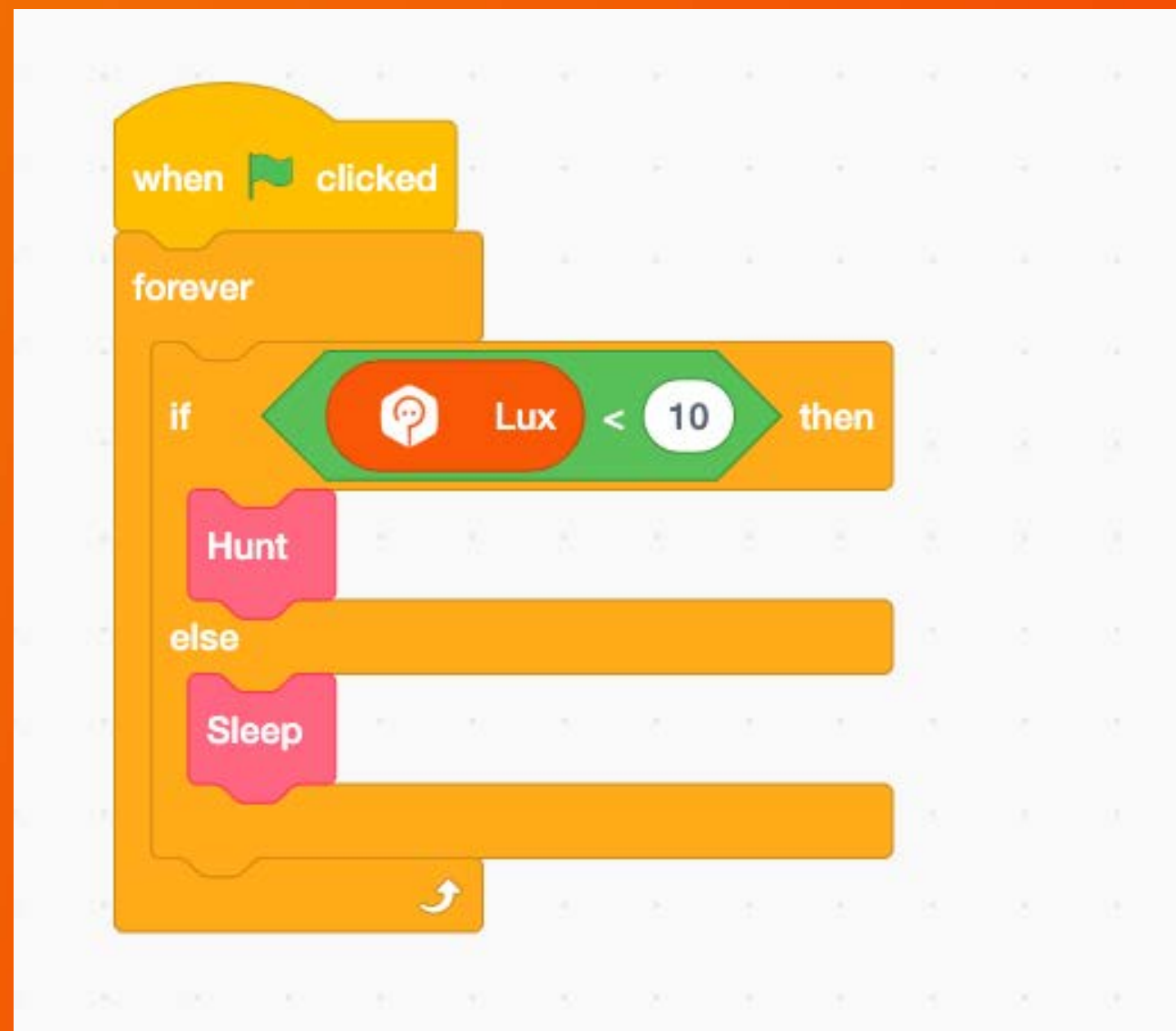
x: 0 y: -41

Show: [Visible] [Hidden]

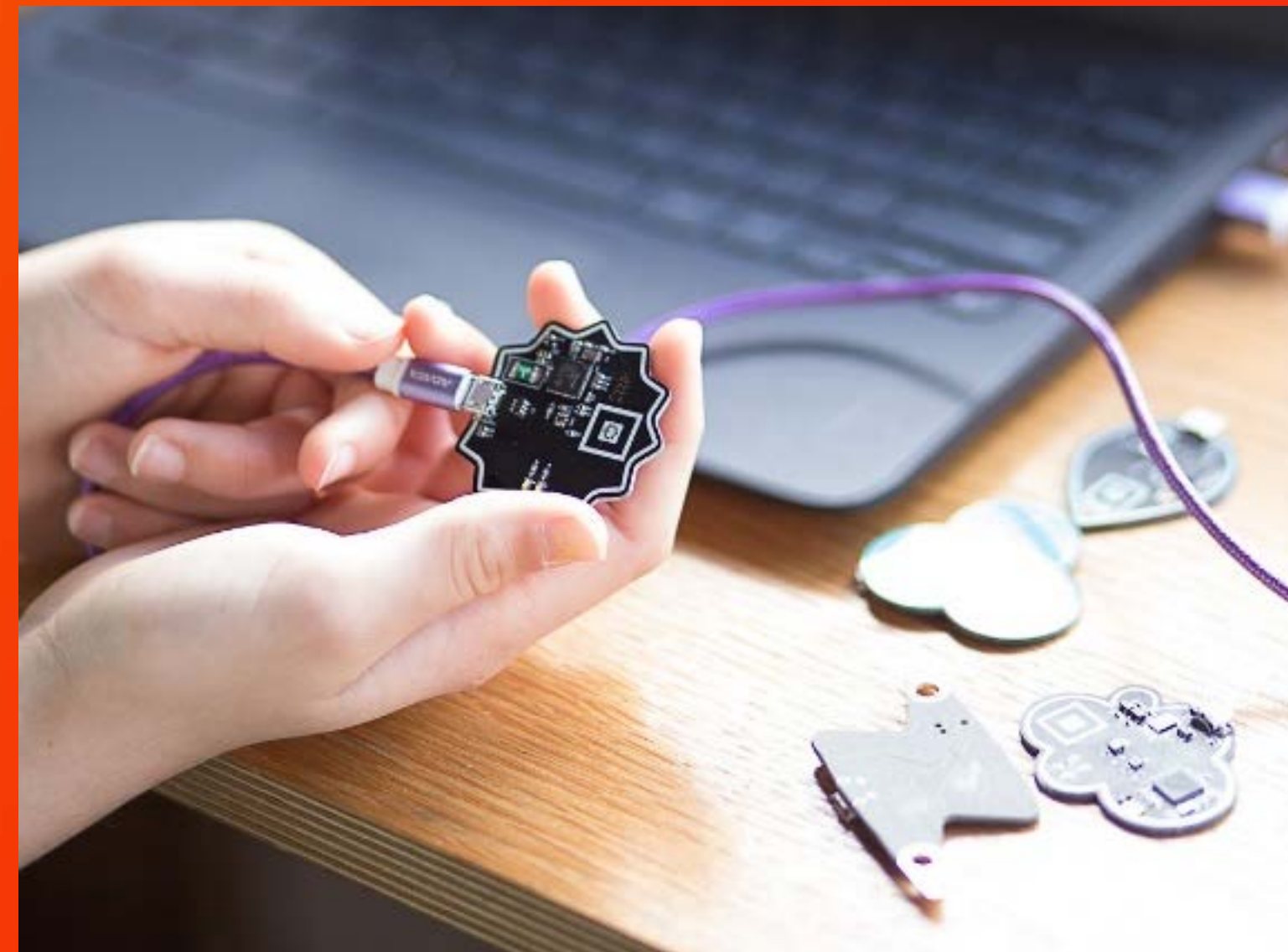
Size: 121 Direction: 90

Backdrops: Bat, Darkness

Scratch and Sense: Using Real-Time Sensor Data to Motivate Students Learning Scratch



Code with Scratch



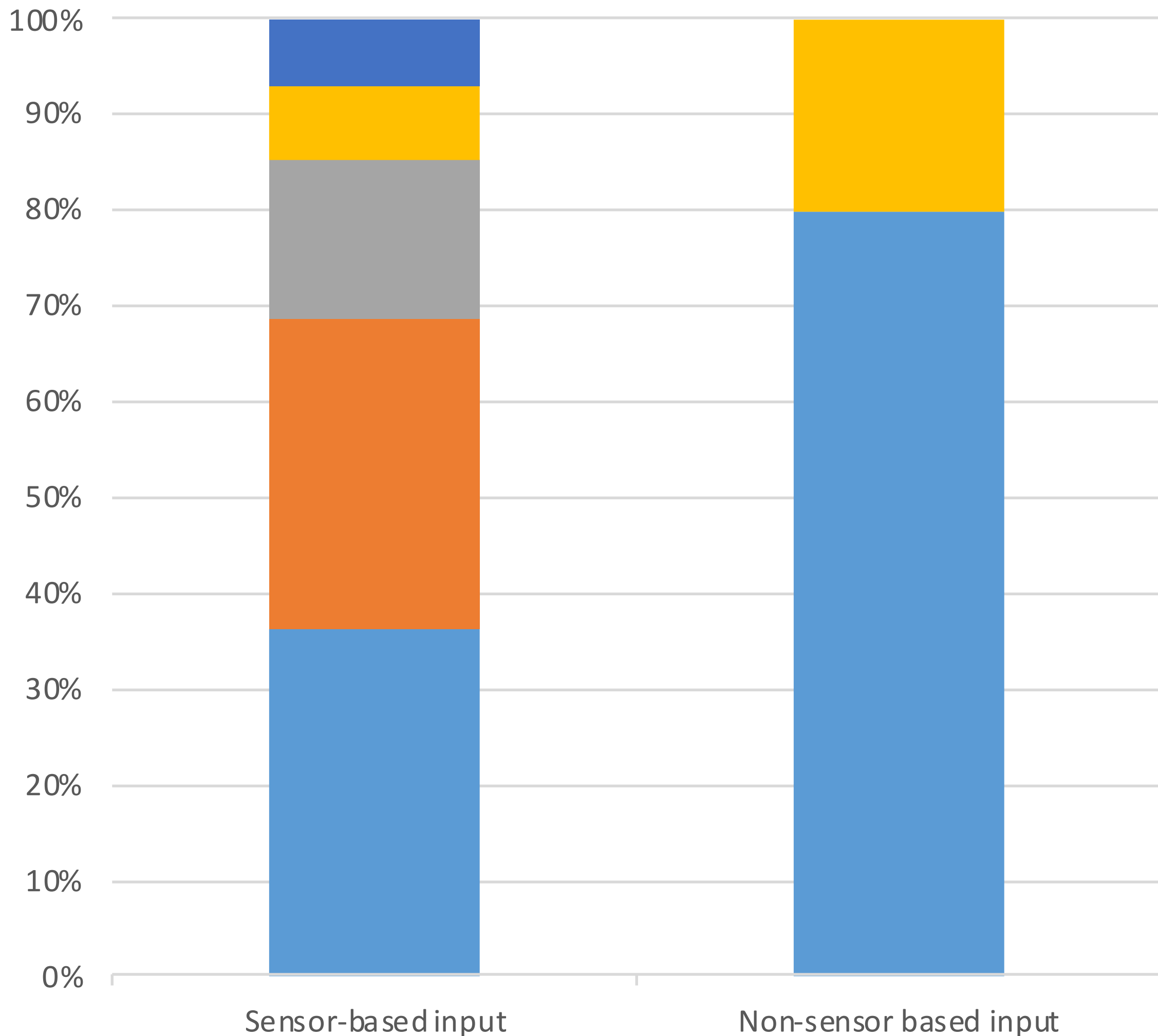
Connect a Sensor



Sense the World

SIGCSE (Under Review)

Distribution of Blocks when Handling Inputs



Scratch Block Type

- Motion
- Looks
- Control
- Sounds
- Further Logic

Self-Reported Intrinsic Motivation on a 7-point Likert Scale

Very True

7

6

5

4

3

2

1

Not at all True

I enjoyed doing this activity very much

This activity was fun to do

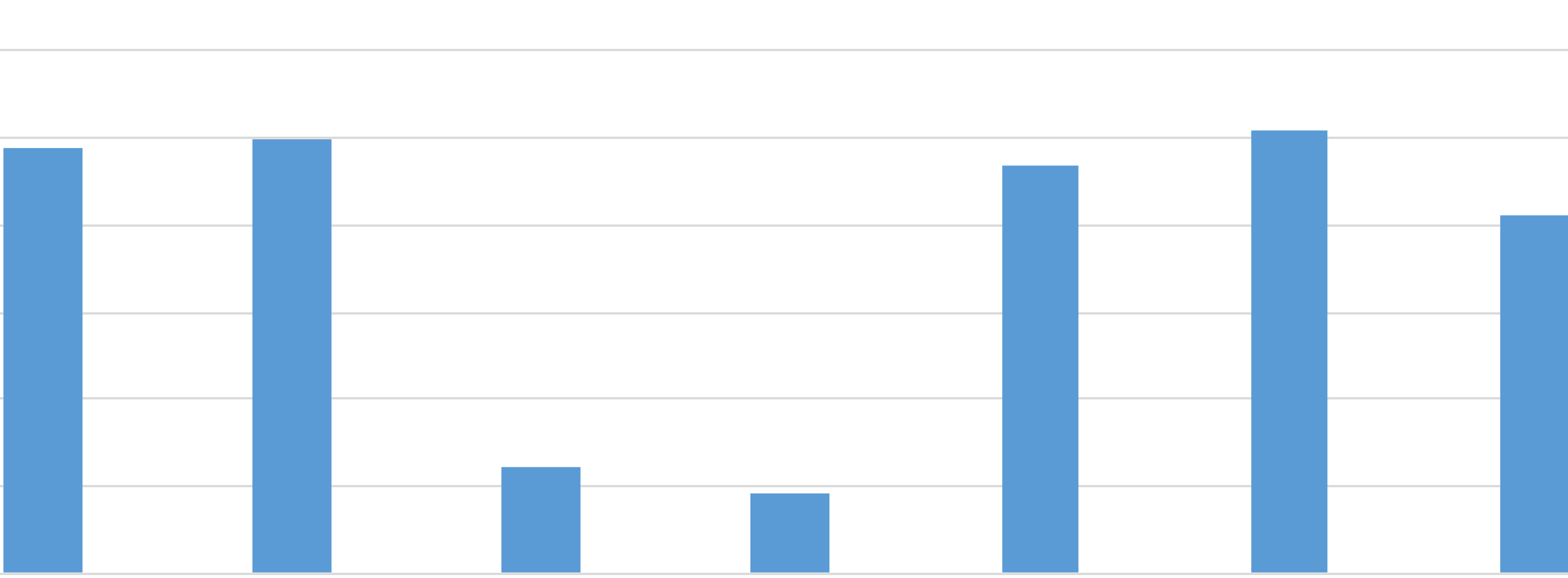
I thought this was a boring activity (R)

This activity did not hold my attention at all (R)

I would describe this activity as very interesting

I thought this activity was quite enjoyable.

While I was doing this activity, I was thinking about how much I enjoyed it

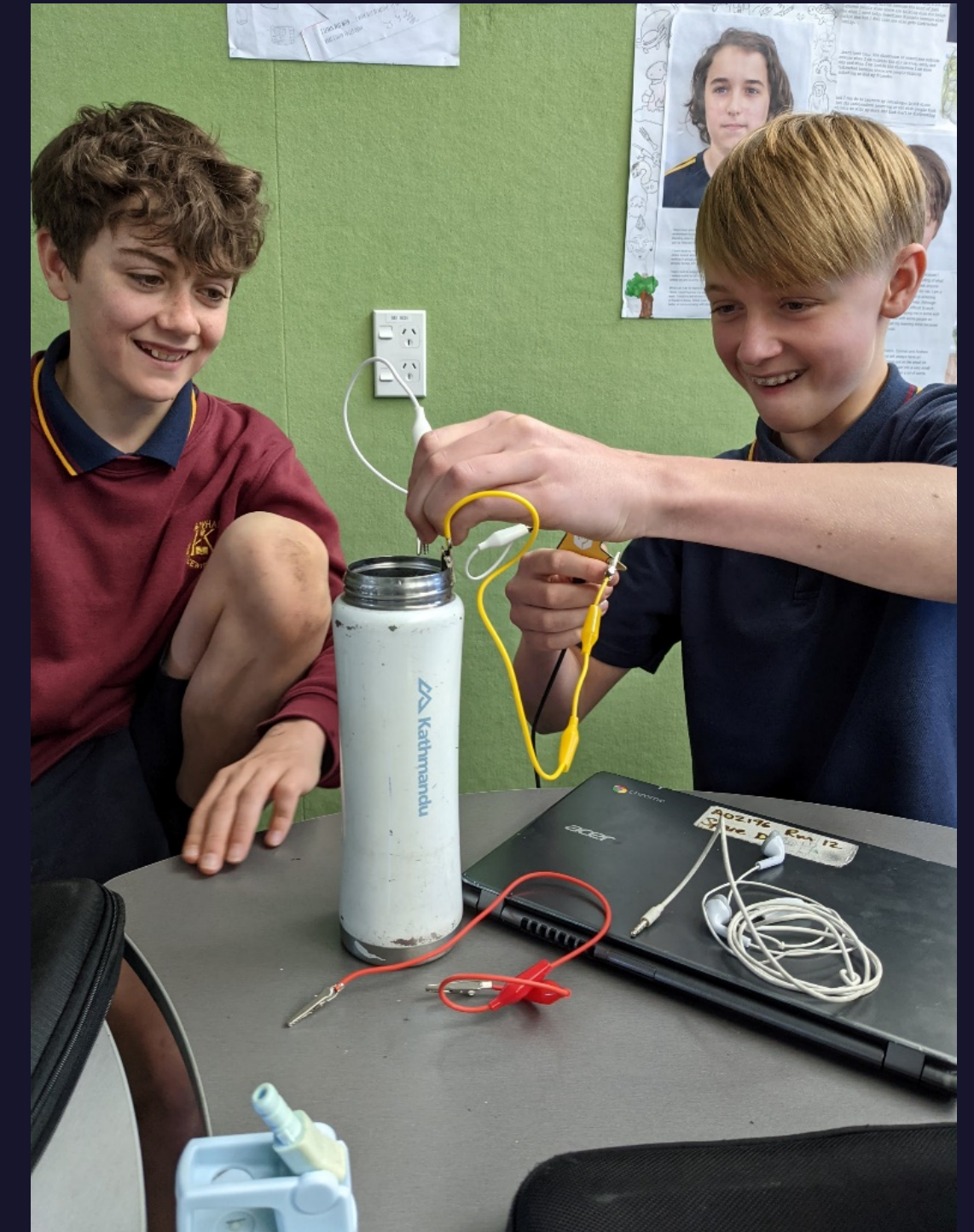


Student Response

"It made things more interactive and changed things up rather than just using Scratch"

"The sensors looked really cool"

"It was interesting how the sensors worked. It was a wonderful experience"



"An interesting thing in my program is that we made a human chain"

"The sensors were fun to use"



Awards and recognitions



VELOCITY 100K CHALLENGE
SOCIAL ENTERPRISE WINNER
2020

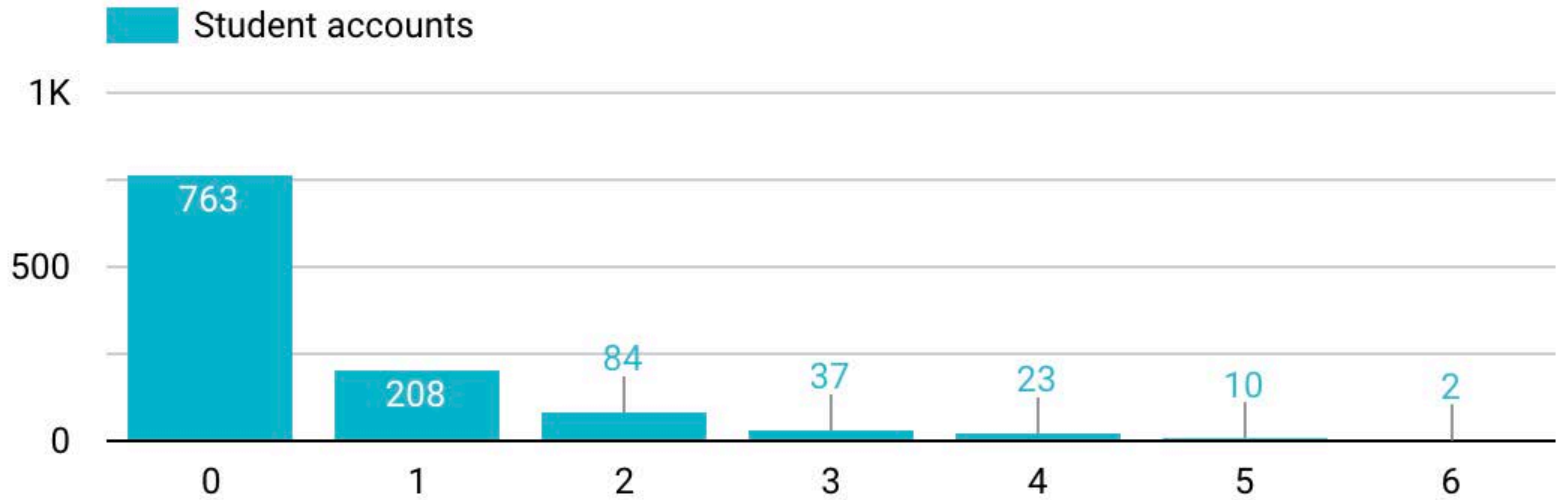
Supporters of Kiwriious



MinterEllison
RuddWatts



Days with inquiries saved

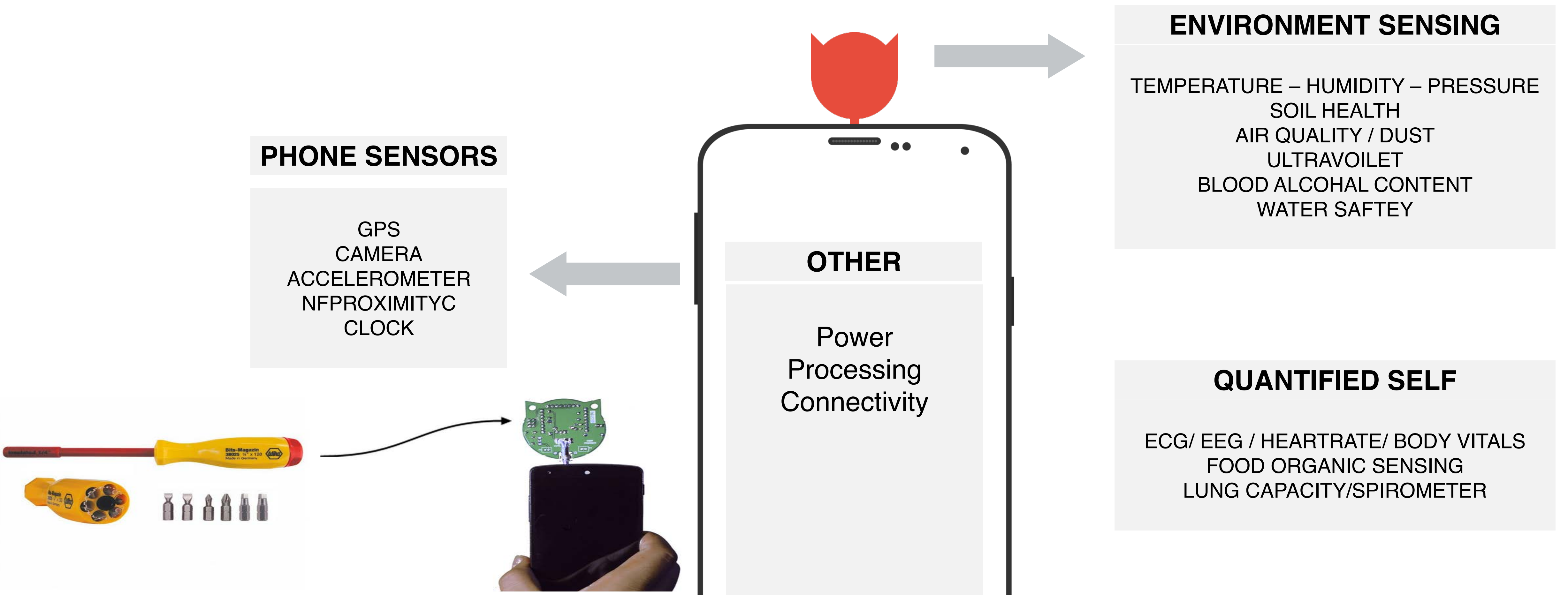


Challenges and Potential

- Motivation & Engagement
- Availability of sensors
- Learning outcomes

Kiwriious Sensors as a probe to the real world

Sensor fusion between smart devices and Kiwriious sensors



Why AR?

- Making the invisible visible
- Visual connection to the 'real world'
- *Give learners more effective entry points to complicated subjects and ideas*



Mobile + AR

Using sensors
accessible to all



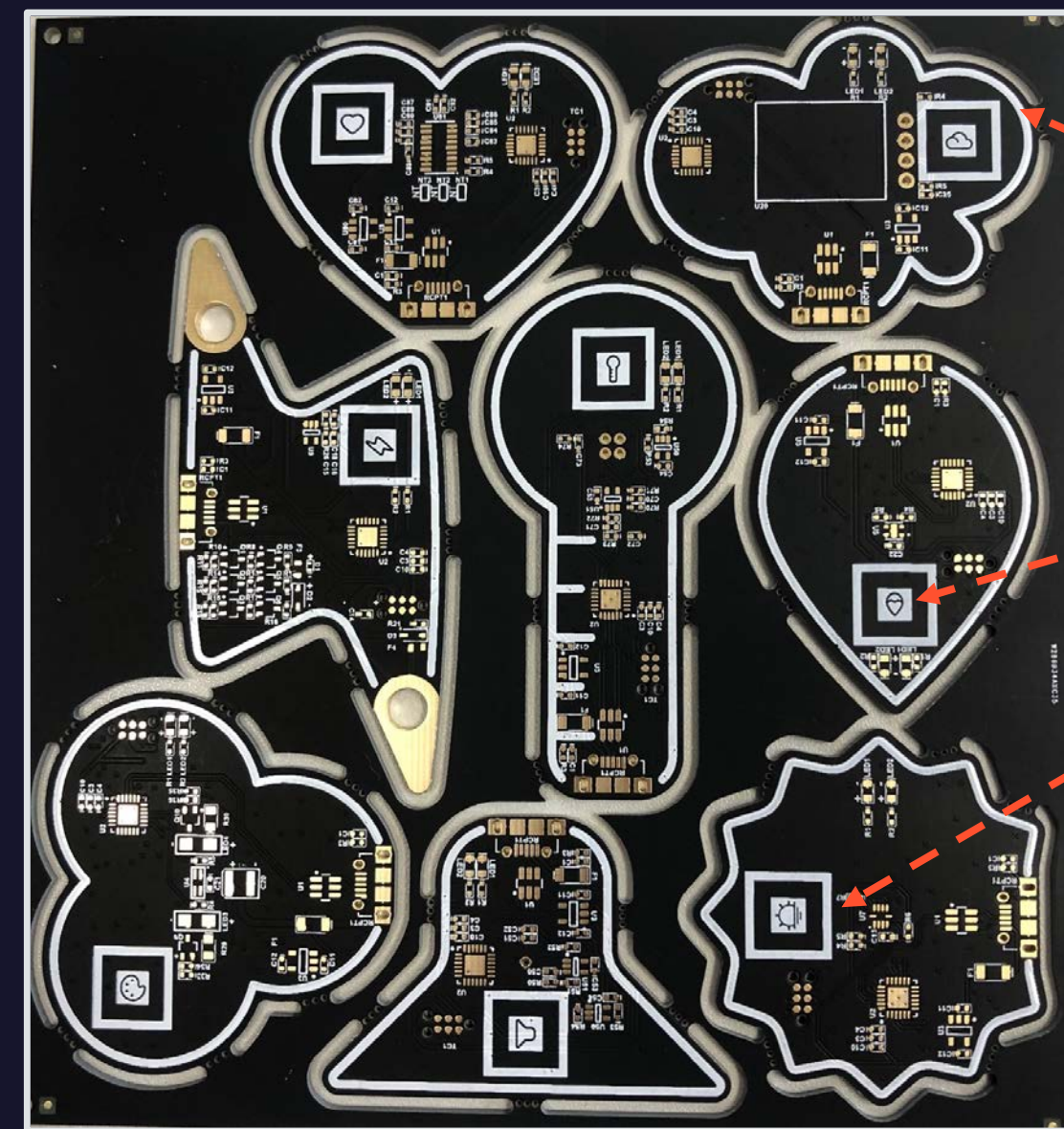
Connecting
experiences and
knowledge



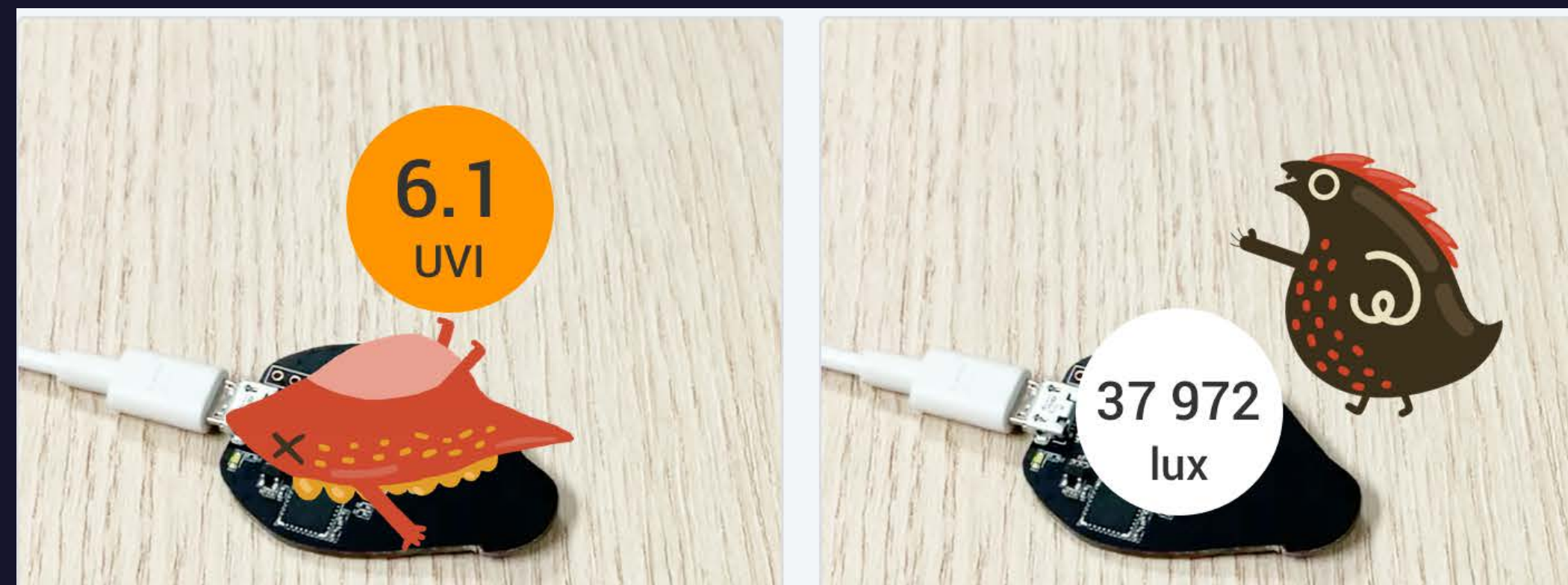
Motivating learning
in unique ways



Sensors built-in capabilities

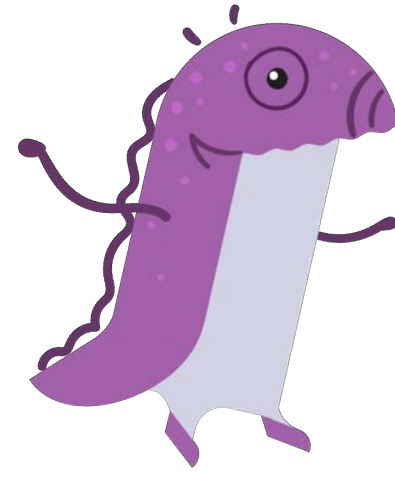


Markers





Thank you



Q & A