



The OpenSTEM
Labs

Activity Classification and Learning Objectives Catalogue **(selected activities in Biology/ Health, Engineering and Physics)**

Output of eSTEE M project “An investigation into the breadth of learning objectives and skills developed in OpenSTEM Labs experiments”

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Using the digital microscope to count leukocytes in blood samples (SDK100)

Experiment Details:

Equipment Name: **Virtual Microscope**

Module Reference: **SDK100**

Experiment Classification:

Experiment Type: **Virtual laboratory**

Online interaction Type: **Stored dataset**

Experimenter: **Group - informal**

Context (how life-like): **Limited context**

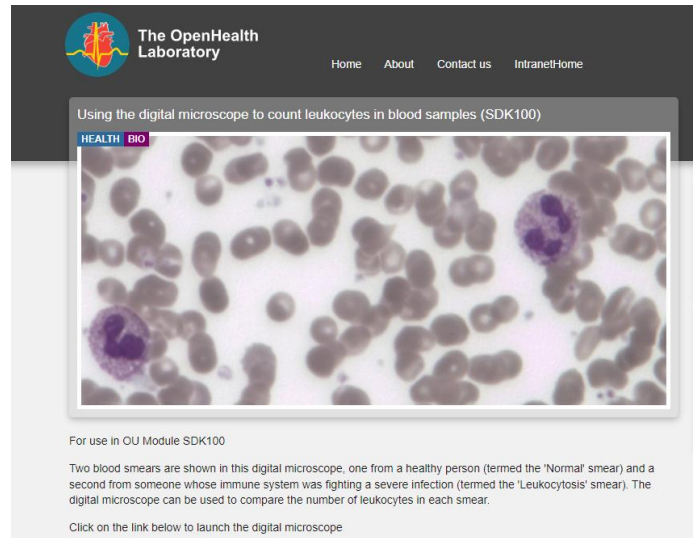
Learning structure: **Directed**

Pre-lab preparation: **Independent**

Pre-requisites: **Module pre-requisites**

Access type: **Open**

In-lab support: **Independent**



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to* ...

- Develop subject knowledge and show understanding
- Apply appropriate instrumentation to make measurements
- Collect data
- Analyse and interpret data
- Use human senses to gather information

By completing this OpenSTEM Labs activity students *will to some extent* be able to ...

- Devise an experimental approach
- Demonstrate creativity in problem solving
- Demonstrate competence in operating apparatus
- Communicate effectively about laboratory work
- Work effectively in teams



Investigating oestrogen receptor status in breast tissue (SDK100)

Experiment Details:

Equipment Name: **Virtual Microscope**

Module Reference: **SDK100**

Experiment Classification:

Experiment Type: **Virtual laboratory**

Online interaction Type: **Stored dataset**

Experimenter: **Individual**

Context (how life-like): **Limited context**

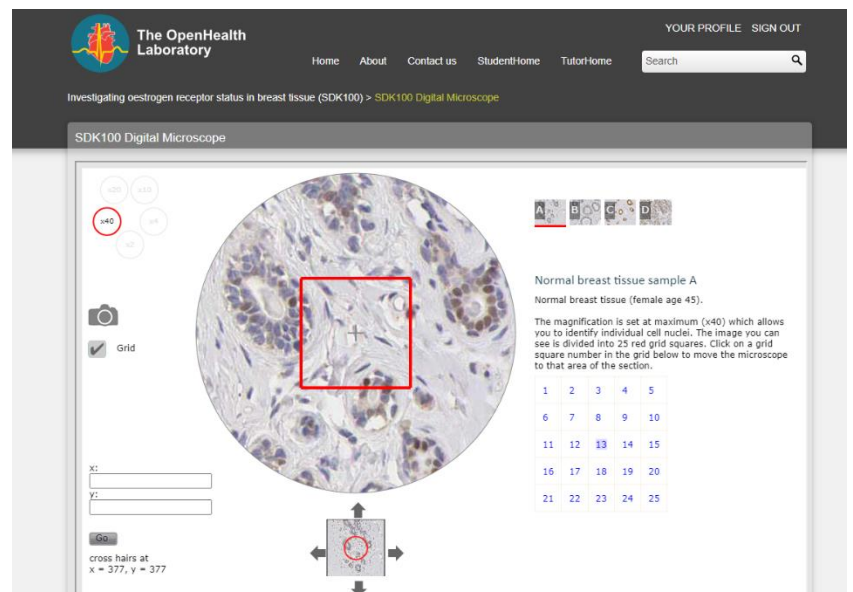
Learning structure: **Directed**

Pre-lab preparation: **Independent**

Pre-requisites: **Module pre-requisites**

Access type: **Open**

In-lab support: **Independent**



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Apply subject knowledge and show understanding
- Apply appropriate instrumentation to make measurements
- Devise experimental approaches
- Collect data
- Analyse and interpret data
- Demonstrate creativity in problem solving
- Communicate effectively about laboratory work
- Use human senses to gather information

By completing this OpenSTEM Labs activity students *will to some extent be able to ...*

- Identify unsuccessful outcomes and learn from failure
- Demonstrate competence in operating apparatus



Using spirometry to assess lung function (SDK100)

Experiment Details:

Equipment Name: Spirometer

Module Reference: SDK100

Experiment Classification:

Experiment Type: **Virtual laboratory**

Online interaction Type: **Stored dataset**

Experimenter: **Individual**

Context (how life-like): **Limited context**

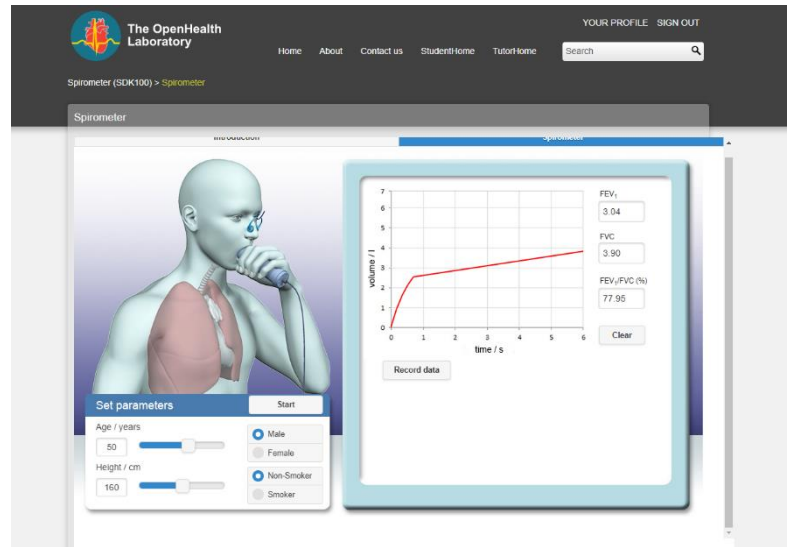
Learning structure: **Directed**

Pre-lab preparation: **Preparatory planning tasks**

Pre-requisites: **None**

Access type: **Open**

In-lab support: **Independent**



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and show understanding
- Analyse and interpret data
- Communicate effectively about laboratory work

By completing this OpenSTEM Labs activity students *will to some extent be able to ...*

- Collect data



An investigation into the acute effects of ethanol on attention (SDK100)

Experiment Details:

Equipment Name: **Rapid Visual Processing (RVP)**
Module Reference: **SDK100**

Experiment Classification:

Experiment Type: **Virtual laboratory**
Online interaction Type: **Algorithm generated**
Experimenter: **Group- informal**
Context (how life-like): **Limited context**
Learning structure: **Directed**
Pre-lab preparation: **Equipment training**
Pre-requisites: **Module pre-requisites**
Access type: **Open**
In-lab support: **Independent**

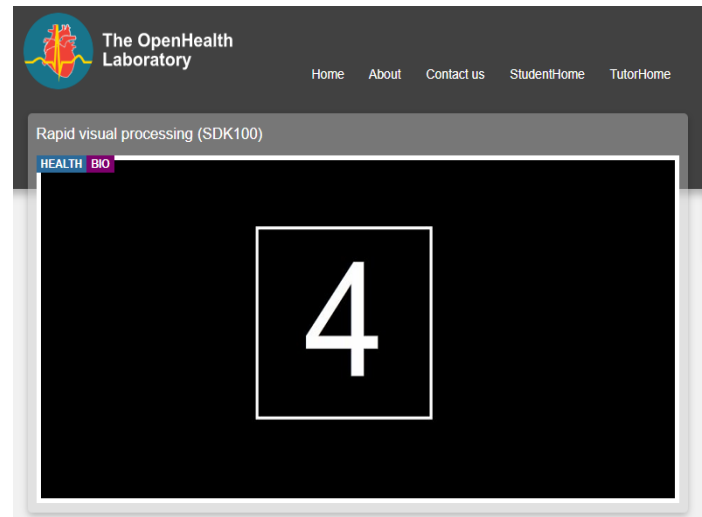
Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to* ...

- Develop subject knowledge and understanding
- Apply appropriate instrumentation to make measurements
- Collect data
- Analyse and interpret data
- Identify unsuccessful outcomes and learn from failure
- Identify and deal with health and safety issues
- Behave with high ethical standards
- Use human senses to gather information

By completing this OpenSTEM Labs activity students *will to some extent be able to* ...

- Devise an experimental approach
- Demonstrate creativity in problem solving
- Demonstrate competence in operating apparatus
- Communicate effectively about laboratory work
- Work effectively in teams





Investigation 1: Studying sustained attention in humans (SXHL288)

Experiment Details:

Equipment Name: **Rapid Visual Processing (RVP)**

Module Reference: **SXHL288**

Experiment Classification:

Experiment Type: **Virtual laboratory**

Online interaction Type: **Algorithm generated**

Experimenter: **Group- formal**

Context (how life-like): **Limited context**

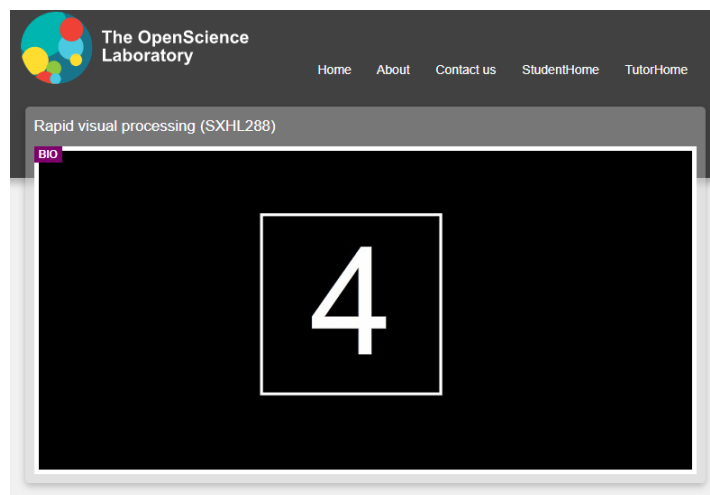
Learning structure: **Directed**

Pre-lab preparation: **Preparatory planning tasks**

Pre-requisites: **Module pre-requisites**

Access type: **Open**

In-lab support: **Tutor guided**



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Apply appropriate instrumentation to make measurements
- Devise an experimental approach
- Collect data
- Analyse and interpret data
- Identify unsuccessful outcomes and learn from failure
- Demonstrate creativity in problem solving
- Identify and deal with health and safety issues
- Behave with high ethical standards
- Use human senses to gather information
- Communicate effectively about laboratory work
- Work effectively in teams

By completing this OpenSTEM Labs activity students *will to some extent be able to ...*

- Demonstrate competence in operating apparatus



Counting moles (SK299)

Experiment Details:

Equipment Name: **Mole counting**

Module Reference: **SK299**

Experiment Classification:

Experiment Type: **Virtual laboratory**

Online interaction Type: **Collected data**

Experimenter: **Group- formal**

Context (how life-like): **Limited context**

Learning structure: **Directed**

Pre-lab preparation: **Preparatory planning tasks**

Pre-requisites: **Module pre-requisites**

Access type: **Open**

In-lab support: **Independent**

The OpenHealth Laboratory

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Mole counting (SK299) > Mole count data entry

Mole count data entry

Use this data collection tool to enter your data anonymously.

Number of moles on your right arm:

Age (years):

Gender: Male Female

Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Collect data
- Analyse and interpret data
- Use human senses to gather information

By completing this OpenSTEM Labs activity students *will to some extent be able to ...*

- Work effectively in teams
- Communicate effectively about laboratory work



The Creatinine clearance test (SK299)

Experiment Details:

Equipment Name: **Creatinine clearance test**

Module Reference: **SK299**

Experiment Classification:

Experiment Type: **Virtual laboratory**

Online interaction Type: **Stored dataset**

Experimenter: **Individual**

Context (how life-like): **Limited context**

Learning structure: **Directed**

Pre-lab preparation: **Preparatory planning tasks**

Pre-requisites: **None**

Access type: **Open**

In-lab support: **Independent**

Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to* ...

- Develop subject knowledge and understanding
- Collect data
- Analyse and interpret data

By completing this OpenSTEM Labs activity students *will to some extent* be able to ...

- Communicate effectively about laboratory work

The screenshot displays the 'Creatinine Clearance Test' interface. On the left, a flowchart shows the process: 'Select age' (40), 'Obtain laboratory results' (plasma creatinine concentration: 0.00903 mg ml⁻¹), 'Calculate GFR' (creatinine clearance: 121 ml min⁻¹), and 'urinary excretion of creatinine' (1.06838 mg min⁻¹). On the right, a gauge shows the glomerular filtration rate (ml min⁻¹) with zones for 'kidney failure' (red, 0-30), 'kidney disease' (orange, 30-90), and 'normal' (green, 90-130). Below the gauge is a table of data:

age	plasma conc.	urine conc.	creatinine clearance
20	0.00903	1.25673	115
40	0.00985	1.04745	118
60	0.00947	0.96440	102
70	0.00889	0.87994	99
80	0.01065	0.80227	75
60	0.00897	1.01680	113



Hominid skull evolution (S112)

Experiment Details:

Equipment Name: **Hominid Skulls**

Module Reference: **S112**

Topics: **Earth, Biology**

Experiment Classification:

Experiment Type: **Virtual laboratory**

Remote Interaction Type: **Stored dataset**

Experimenter: **Individual**

Context (how life-like): **3D/ Immersive**

Learning structure: **Directed**

Pre-lab preparation: **N/A**

Pre-requisites: **None**

Access type: **Open**

In-lab support: **Independent**

The OpenScience Laboratory

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Hominid skull evolution (S112)

EARTH BIO ENV

UNIVERSITY OF CAMBRIDGE

Explore the features of a collection of hominid skulls and take measurements that will enable you to determine the evolutionary relationships between them.

Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Apply appropriate instrumentation to make measurements
- Collect data
- Analyse and interpret data
- Communicate effectively about laboratory work
- Use human senses to gather information



Controlling a driven pendulum (T212)

Experiment Details:

Equipment Name: **Pendulum**

Module Reference: **T212**

Topics: **Electronics, Engineering**

Experiment Classification:

Experiment Type: **Remote laboratory**

Remote Interaction Type: **Fixed**

Experimenter: **Individual**

Context (how life-like): **Realtime video**

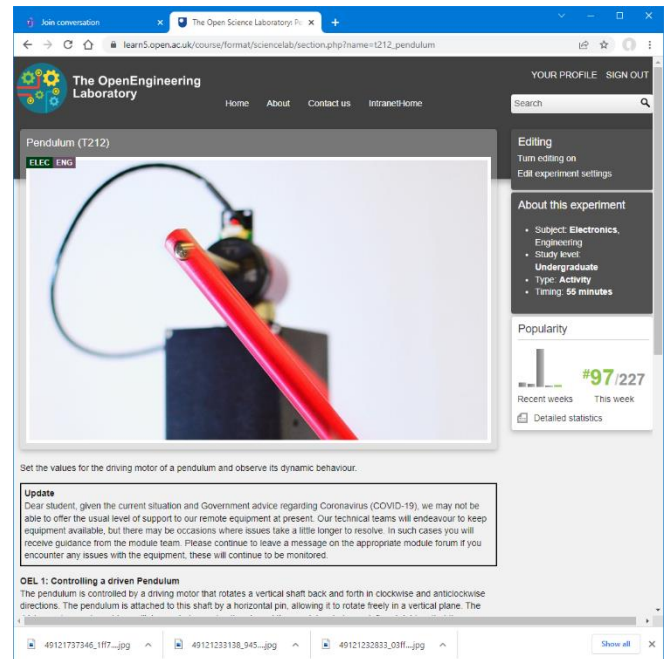
Learning structure: **Directed**

Pre-lab preparation: **Exploratory (in the lab)**

Pre-requisites: **None**

Access type: **Bookable**

In-lab support: **Assisted - asynchronous**



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Use theoretical models to predict behaviour
- Collect data
- Analyse and interpret data
- Demonstrate competence in operating apparatus
- Use human senses to gather information

By completing this OpenSTEM Labs activity students *will to some extent* be able to ...

- Apply appropriate instrumentation to make measurements
- Devise experimental approach
- Identify unsuccessful outcomes and learn from failure
- Demonstrate creativity in problem solving



Testing a real photodiode (T212)

Experiment Details:

Equipment Name: **Light and strain experiments**

Module Reference: **T212**

Topics: **Electronics, Engineering**

Experiment Classification:

Experiment Type: **Remote laboratory**

Remote Interaction Type: **Fixed**

Experimenter: **Individual**

Context (how life-like): **Realtime video**

Learning structure: **Directed**

Pre-lab preparation: **Exploratory (in the lab)**

Pre-requisites: **Module pre-requisites**

Access type: **Bookable**

In-lab support: **Assisted - asynchronous**

The screenshot shows the OpenSTEM Labs interface for the 'Light and strain experiments (RMT)' activity. The page features a video of the experimental setup, a sidebar with editing options, and a main content area with an update and a description of the photodiode experiment.

Update
Dear student, given the current situation and UK Government advice regarding Coronavirus (COVID-19), we may not be able to offer the usual level of support to our remote equipment at present. Our technical teams will endeavour to keep equipment available, but there may be occasions where issues take a little longer to resolve. In such cases you will receive guidance from your course lead.

Testing a real photodiode
In this activity you will experiment with data that you will collect from two photodiodes, one responding to visible light and the other responding to infrared light. The objective is to set resistor values so that the sensors have the widest possible range of values without becoming saturated. When you go through to the experiment, you will be presented with two options, you should choose **Light (OEL2.1)**.

Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Collect data
- Analyse and interpret data
- Demonstrate competence in operating apparatus
- Use human senses to gather information

By completing this OpenSTEM Labs activity students *will to some extent* be able to ...

- Apply appropriate instrumentation to make measurements
- Use theoretical models to predict behaviour
- Devise experimental approach
- Identify unsuccessful outcomes and learn from failure
- Demonstrate creativity in problem solving



Strain Gauge experiment (T212)

Experiment Details:

Equipment Name: **Light and strain experiments**

Module Reference: **T212**

Topics: **Electronics, Engineering**

Experiment Classification:

Experiment Type: **Remote laboratory**

Remote Interaction Type: **Fixed**

Experimenter: **Individual**

Context (how life-like): **Realtime video**

Learning structure: **Directed**

Pre-lab preparation: **Exploratory (in the lab)**

Pre-requisites: **Module pre-requisites**

Access type: **Bookable**

In-lab support: **Assisted - asynchronous**

The screenshot shows the OpenSTEM Labs interface for the 'Light and strain experiments (RMIT)' activity. The page features a video of the experimental setup, a sidebar with editing options, and a main content area with an update regarding COVID-19 and a section for testing a real photodiode.

Update
Dear student, given the current situation and UK Government advice regarding Coronavirus (COVID-19), we may not be able to offer the usual level of support to our remote equipment at present. Our technical teams will endeavour to keep equipment available, but there may be occasions where issues take a little longer to resolve. In such cases you will receive guidance from your course lead.

Testing a real photodiode
In this activity you will experiment with data that you will collect from two photodiodes, one responding to visible light and the other responding to infrared light. The objective is to set resistor values so that the sensors have the widest possible range of values without becoming saturated. When you go through to the experiment, you will be presented with two options, you should choose **Light (OEL2.1)**.

Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Use theoretical models to predict behaviour
- Devise experimental approach
- Collect data
- Analyse and interpret data
- Use human senses to gather information

By completing this OpenSTEM Labs activity students *will to some extent be able to ...*

- Apply appropriate instrumentation to make measurements
- Demonstrate creativity in problem solving
- Demonstrate competence in operating apparatus



Sampling and Fourier analysis (T212)

Experiment Details:

Equipment Name: **Fourier (T212)**

Module Reference: **T212**

Topics: **Electronics, Engineering**

Experiment Classification:

Experiment Type: **Remote laboratory**

Remote Interaction Type: **Fixed**

Experimenter: **Individual**

Context (how life-like): **Realtime video**

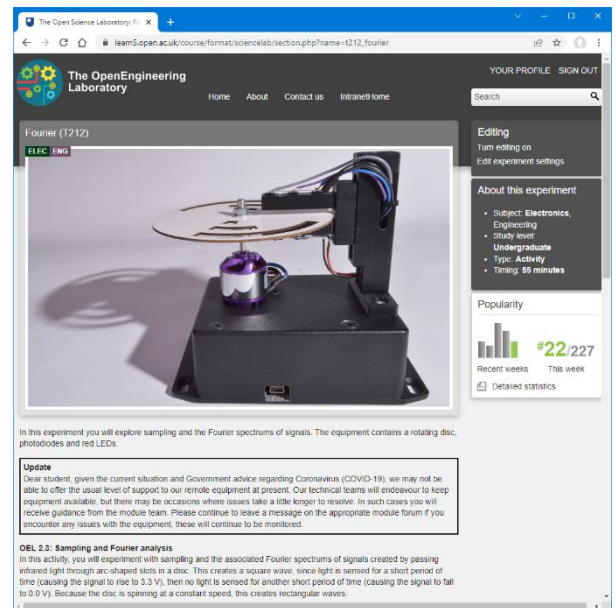
Learning structure: **Directed**

Pre-lab preparation: **Exploratory (in the lab)**

Pre-requisites: **Module pre-requisites**

Access type: **Bookable**

In-lab support: **Assisted - asynchronous**



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Use theoretical models to predict behaviour
- Collect data
- Analyse and interpret data
- Use human senses to gather information

By completing this OpenSTEM Labs activity students *will to some extent be able to ...*

- Apply appropriate instrumentation to make measurements
- Devise experimental approach
- Demonstrate creativity in problem solving
- Demonstrate competence in operating apparatus



A Logic gate exercise (T212)

Experiment Details:

Equipment Name: **Digital Board Experiments**

Module Reference: **T212**

Topics: **Electronics, Engineering**

Experiment Classification:

Experiment Type: **Remote laboratory**

Remote Interaction Type: **Fixed**

Experimenter: **Individual**

Context (how life-like): **Realtime video**

Learning structure: **Directed**

Pre-lab preparation: **N/A**

Pre-requisites: **Module pre-requisites**

Access type: **Bookable**

In-lab support: **Assisted - asynchronous**

The screenshot shows the OpenSTEM Labs interface for the 'Digital board experiments (T212)' activity. The main content area displays a video of a digital logic board with various components like logic gates and LEDs. Below the video, there is a text description: 'This board contains a range of logic devices that you will connect together to form digital circuits. The logic board has four experiments associated with it.' There is also an 'Update' section with a message from the technical teams regarding COVID-19. On the right side, there is a sidebar with 'YOUR PROFILE', 'SIGN OUT', a search bar, and a 'Popularity' chart showing a bar graph with the number 39/227 and a 'Detailed statistics' link.

Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Demonstrate competence in operating apparatus

By completing this OpenSTEM Labs activity students *will to some extent be able to ...*

- Analyse and interpret data
- Identify unsuccessful outcomes and learn from failure
- Use human senses to gather information
- Design, build, or assemble a product



Building a decoder circuit (T212)

Experiment Details:

Equipment Name: **Digital Board Experiments**

Module Reference: **T212**

Topics: **Electronics, Engineering**

Experiment Classification:

Experiment Type: **Remote laboratory**

Remote Interaction Type: **Fixed**

Experimenter: **Individual**

Context (how life-like): **Realtime video**

Learning structure: **Directed**

Pre-lab preparation: **N/A**

Pre-requisites: **Module pre-requisites**

Access type: **Bookable**

In-lab support: **Assisted - asynchronous**

The screenshot shows the OpenSTEM Labs website interface. The main content area displays a video of a digital logic board with various components. The sidebar on the right contains the following information:

- YOUR PROFILE** | SIGN OUT
- Search bar
- Editing**
 - Turn editing on
 - Edit experiment settings
- About this experiment**
 - Subject: Electronics, Engineering
 - Study level: Undergraduate
 - Type: Activity
 - Timing: 55 minutes
- Popularity**
 - Recent weeks: #39/227
 - This week: [Bar chart showing a slight increase]
 - Detailed statistics

Below the video, there is a text block: "This board contains a range of logic devices that you will connect together to form digital circuits. The logic board has four experiments associated with it."

An **Update** section follows: "Dear student, given the current situation and Government advice regarding Coronavirus (COVID-19), we may not be able to offer the usual level of support to our remote equipment at present. Our technical teams will endeavour to keep equipment available, but there may be occasions where issues take a little longer to resolve. In such cases you will receive guidance from the module team. Please continue to leave a message on the appropriate module forum if you encounter any issues with the equipment, these will continue to be monitored."

Two learning objectives are listed:

- OEL 3.1: A logic gate exercise**
In this experiment you will find out how to interface with the digital logic board, and how to set up logic conditions on the input pins of logic gates on the board and test their function.
- OEL 3.2: Building a decoder circuit**
In this experiment you will design and build a 2-to-1 decoder which has two outputs for a 2-bit input. You will be able to test the decoder using a logic simulator and a logic board.

Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Demonstrate competence in operating apparatus
- Design, build, or assemble a product

By completing this OpenSTEM Labs activity students *will to some extent be able to ...*

- Devise experimental approach
- Analyse and interpret data
- Identify unsuccessful outcomes and learn from failure
- Demonstrate creativity in problem solving
- Use human senses to gather information



Designing a combinational circuit (T212)

Experiment Details:

Equipment Name: **Digital Board Experiments**

Module Reference: **T212**

Topics: **Electronics, Engineering**

Experiment Classification:

Experiment Type: **Remote laboratory**

Remote Interaction Type: **Fixed**

Experimenter: **Individual**

Context (how life-like): **Realtime video**

Learning structure: **Directed**

Pre-lab preparation: **N/A**

Pre-requisites: **Module pre-requisites**

Access type: **Bookable**

In-lab support: **Assisted - asynchronous**

The screenshot displays the OpenSTEM Labs interface for the 'Digital board experiments (T212)'. The main content area shows a video of a digital logic board. The sidebar on the right provides details about the experiment, including the subject (Electronics, Engineering), study level (Undergraduate), type (Activity), and timing (55 minutes). A popularity chart indicates 39,227 views. An 'Update' section at the bottom of the page mentions that due to the COVID-19 situation, the usual level of support for remote equipment is not available, and technical teams are working to resolve issues.

Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Demonstrate competence in operating apparatus
- Use human senses to gather information
- Design, build, or assemble a product

By completing this OpenSTEM Labs activity students will *to some extent* be able to ...

- Apply appropriate instrumentation to make measurements
- Use theoretical models to predict behaviour
- Identify unsuccessful outcomes and learn from failure
- Demonstrate creativity in problem solving



Implementing and testing a sequential circuit (T212)

Experiment Details:

Equipment Name: **Digital Board Experiments**

Module Reference: **T212**

Topics: **Electronics, Engineering**

Experiment Classification:

Experiment Type: **Remote laboratory**

Remote Interaction Type: **Fixed**

Experimenter: **Individual**

Context (how life-like): **Realtime video**

Learning structure: **Directed**

Pre-lab preparation: **N/A**

Pre-requisites: **Module pre-requisites**

Access type: **Bookable**

In-lab support: **Assisted - asynchronous**

The screenshot displays the OpenSTEM Labs interface for the 'Digital board experiments (T212)' activity. The main content area shows a video of a digital logic board. The sidebar on the right provides details about the experiment, including its subject (Electronics, Engineering), study level (Undergraduate), type (Activity), and timing (55 minutes). A popularity chart indicates 39,227 views. An 'Update' section at the bottom of the page mentions that due to COVID-19, the usual level of support for remote equipment is currently limited, and technical teams are working to resolve any issues that may arise.

Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Demonstrate competence in operating apparatus
- Use human senses to gather information
- Design, build, or assemble a product

By completing this OpenSTEM Labs activity students will *to some extent* be able to ...

- Apply appropriate instrumentation to make measurements
- Use theoretical models to predict behaviour
- Identify unsuccessful outcomes and learn from failure



Explore changes in electrical resistance of a material over a range of temperatures (T271)

Experiment Details:

Equipment Name: **Resistivity**

Module Reference: **T271**

Topics: **Engineering**

Experiment Classification:

Experiment Type: **Remote laboratory**

Remote Interaction Type: **Observation**

Experimenter: **Other**

Context (how life-like): **Realtime video**

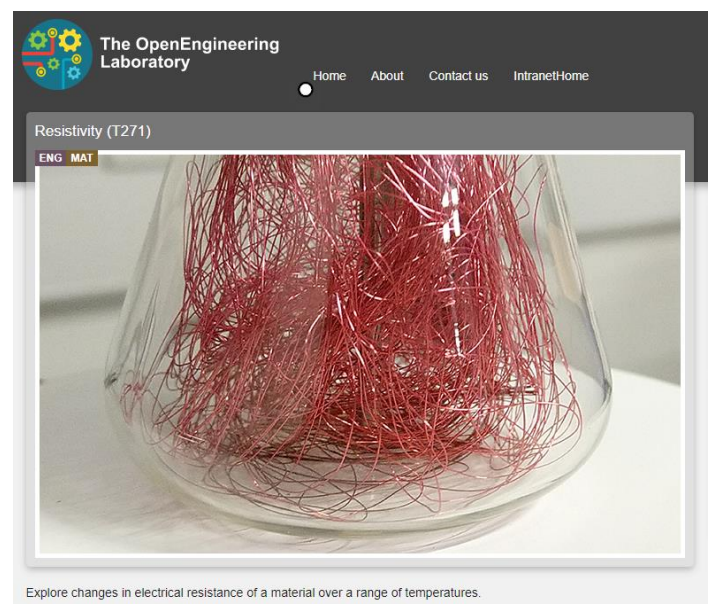
Learning structure: **Directed**

Pre-lab preparation: **N/A**

Pre-requisites: **None**

Access type: **Open**

In-lab support: **Assisted - asynchronous**



Explore changes in electrical resistance of a material over a range of temperatures.

Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Analyse and interpret data
- Communicate effectively about laboratory work
- Use human senses to gather information

By completing this OpenSTEM Labs activity students *will to some extent be able to ...*

- Apply appropriate instrumentation to make measurements
- Collect data



Investigating strain in a thick-walled pressure vessel (T272)

Experiment Details:

Equipment Name: **Pressure Vessel**

Module Reference: **T272**

Topics: **Engineering**

Experiment Classification:

Experiment Type: **Remote laboratory**

Remote Interaction Type: **Fixed**

Experimenter: **Individual**

Context (how life-like): **Realtime video**

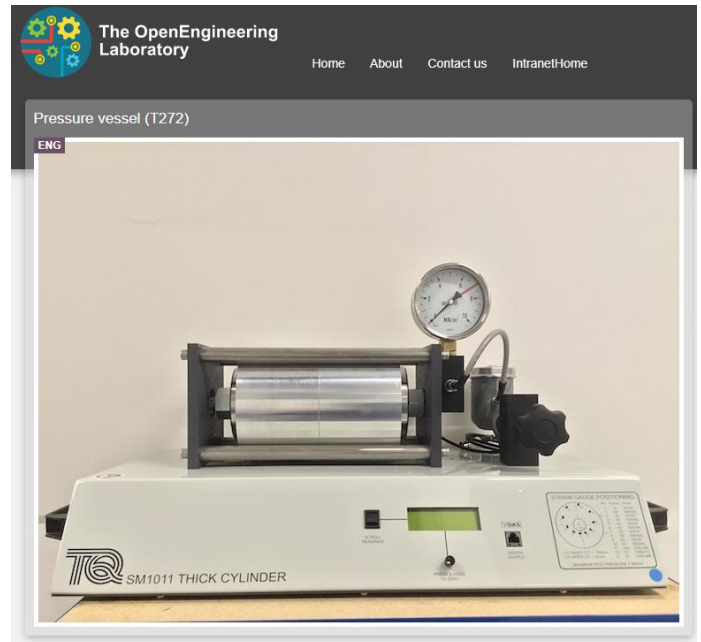
Learning structure: **Directed**

Pre-lab preparation: **N/A**

Pre-requisites: **None**

Access type: **Bookable**

In-lab support: **Assisted - asynchronous**



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Apply appropriate instrumentation to make measurements
- Use theoretical models to predict behaviour
- Collect data
- Analyse and interpret data
- Demonstrate competence in operating apparatus
- Communicate effectively about laboratory work
- Use human senses to gather information

By completing this OpenSTEM Labs activity students *will to some extent* be able to ...

Identify and deal with health and safety issues



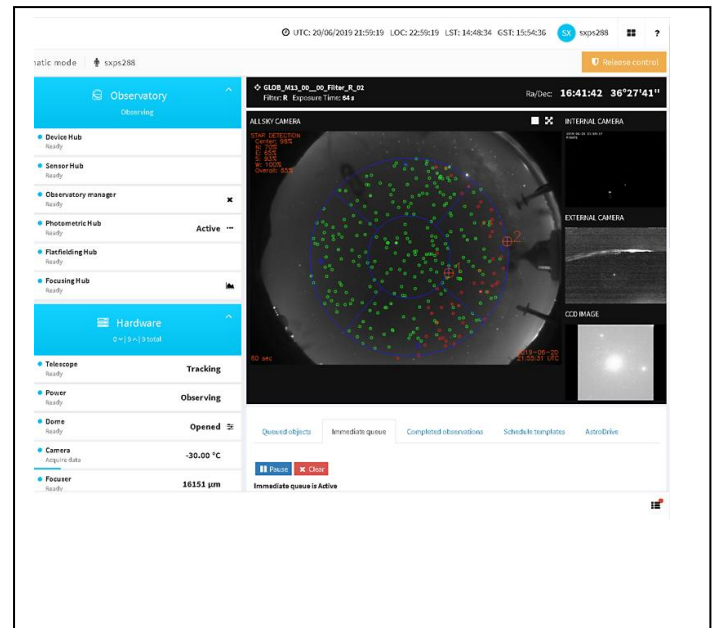
PIRATE and COAST (SXPS288)

Experiment Details:

Equipment Name: **Remote Telescope**
Module Reference: **SXPS288**

Experiment Classification:

Experiment Type: **Remote laboratory**
Remote Interaction Type: **Adaptive**
Experimenter: **Group - informal**
Context (how life-like): **Real-time video**
Learning structure: **Directed**
Pre-lab preparation: **Preparatory planning tasks**
Pre-requisites: **Module pre-requisites**
Access type: **Bookable**
In-lab support: **Assisted - asynchronous**



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to* ...

- Develop subject knowledge and understanding
- Apply appropriate instrumentation to make measurements
- Collect data
- Analyse and interpret data
- Demonstrate competence in operating apparatus
- Communicate effectively about laboratory work and work effectively in teams

By completing this OpenSTEM Labs activity students *will to some extent* be able to ...

- Devise an experimental approach
- Identify unsuccessful outcomes and learn from failure



Compton Scattering (SXPS288)

Experiment Details:

Equipment Name: X-ray scattering
Module Reference: SXPS288

Experiment Classification:

Experiment Type: Remote laboratory
Remote Interaction Type: Fixed
Experimenter: Group - informal
Context (how life-like): Real-time video
Learning structure: Directed
Pre-lab preparation: Preparatory planning tasks
Pre-requisites: Module pre-requisites
Access type: Bookable
In-lab support: Independent



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to* ...

- Develop subject knowledge and understanding
- Apply appropriate instrumentation to make measurements
- Use theoretical models to predict behaviour
- Collect data
- Analyse and interpret data
- Identify unsuccessful outcomes and learn from failure
- Demonstrate competence in operating apparatus
- Communicate effectively about laboratory work

By completing this OpenSTEM Labs activity students *will to some extent be able to* ...

- Identify and deal with health and safety issues
- Work effectively in teams



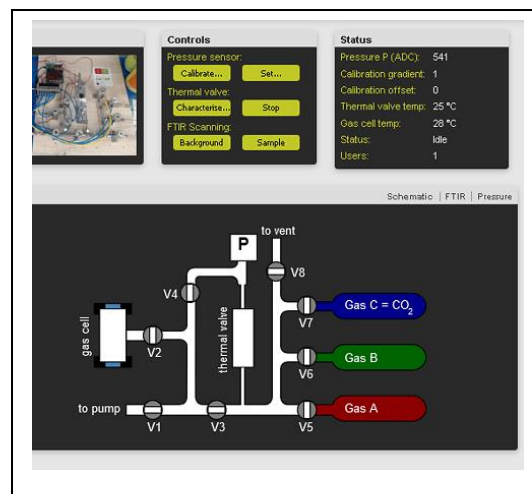
Gas Cell (SXPS288)

Experiment Details:

Equipment Name: **Gas Cell and Lines**
Module Reference: **SXPS288**

Experiment Classification:

Experiment Type: **Remote laboratory**
Remote Interaction Type: **Adaptive**
Experimenter: **Individual**
Context (how life-like): **Real-time video**
Learning structure: **Directed**
Pre-lab preparation: **Exploratory (in the lab)**
Pre-requisites: **Module pre-requisites**
Access type: **Bookable**
In-lab support: **Independent**



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to ...*

- Develop subject knowledge and understanding
- Apply appropriate instrumentation to make measurements
- Use theoretical models to predict behaviour
- Collect data
- Analyse and interpret data
- Identify unsuccessful outcomes and learn from failure
- Demonstrate competence in operating apparatus
- Communicate effectively about laboratory work

By completing this OpenSTEM Labs activity students *will to some extent be able to ...*

- Identify and deal with health and safety issues
- Devise an experimental approach



ARROW (SXPS288)

Experiment Details:

Equipment Name: **Remote Telescope**
Module Reference: **SXPS288**

Experiment Classification:

Experiment Type: **Remote laboratory**
Remote Interaction Type: **Adaptive**
Experimenter: **Group- informal**
Context (how life-like): **Real-time video**
Learning structure: **Directed**
Pre-lab preparation: **Preparatory planning tasks**
Pre-requisites: **Module pre-requisites**
Access type: **Bookable**
In-lab support: **Assessed-asynchronous**

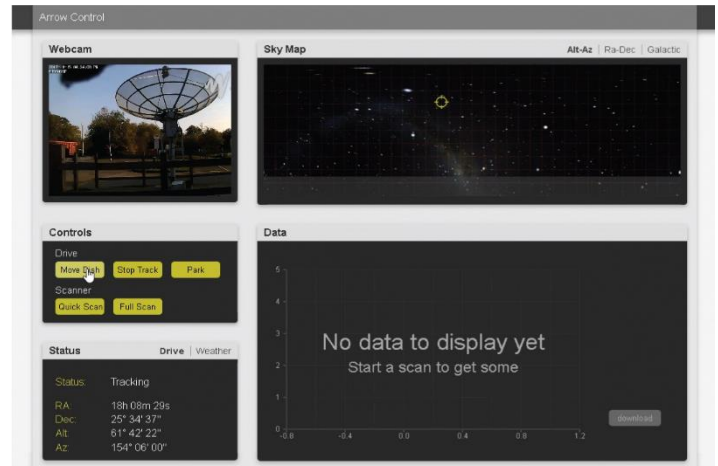
Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to* ...

- Develop subject knowledge and understanding
- Apply appropriate instrumentation to make measurements
- Use theoretical models to predict behaviour
- Collect data
- Analyse and interpret data
- Demonstrate competence in operating apparatus
- Communicate effectively about laboratory work
- Work effectively in teams

By completing this OpenSTEM Labs activity students *will to some extent* be able to ...

- Devise an experimental approach
- Identify unsuccessful outcomes and learn from failure





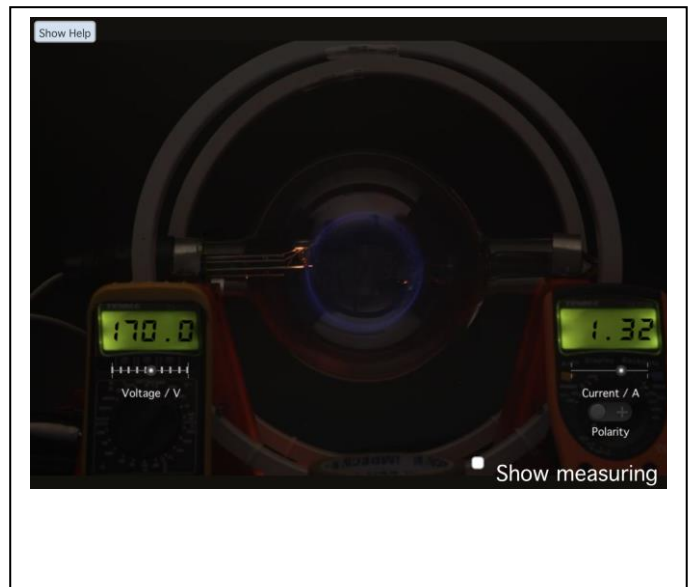
Mass to Charge (SXPS288)

Experiment Details:

Equipment Name: **Fine beam tube**
Module Reference: **SXPS288**

Experiment Classification:

Experiment Type: **Virtual laboratory**
Online Interaction Type: **Immersive**
Experimenter: **Individual**
Context (how life-like): **3D/Immersive**
Learning structure: **Open**
Pre-lab preparation: **Exploratory (in the lab)**
Pre-requisites: **Module pre-requisites**
Access type: **Open**
In-lab support: **Independent**



Learning Objectives:

By completing this OpenSTEM Labs activity students *will be able to* ...

- Develop subject knowledge and understanding
- Use theoretical models to predict behaviour
- Collect data
- Identify unsuccessful outcomes and learn from failure

By completing this OpenSTEM Labs activity students *will to some extent be able to* ...

- Devise an experimental approach
- Analyse and interpret data