SPARKvue
User's Guide

PASCO ®

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Introduction

About SPARKvue

SPARKvue software combines multimedia curriculum, real-time data collection, and powerful scientific analysis tools in an easy-to-use, icon-based user interface. SPARKvue is compatible with all PASCO PASPORT sensors and interfaces.

SPARKvue is designed to become the center of your school's discovery-based science learning environment, providing both teacher and student the embedded support for exploring scientific concepts.

SPARKvue includes six free pre-installed SPARKlabs™ — standards-based guided inquiry labs in a unique electronic notebook format. These SPARKlabs integrate background content, data collection and analysis, even assessment — all within the same environment. Everything you need is right there in context.

Getting started

There are three basic ways to start an investigation in SPARKvue. They are:

- *Open* an embedded SPARKlab and follow the on-screen instructions;

- *Show* a SPARKlab with one measurement in a graph, table, digits display, and meter; and

- *Build* a custom SPARKlab with your choice of data, displays, text, and pictures.

To start learning SPARKvue, install the software, connect an interface to your computer, plug in a sensor, and start the software from the desktop icon. If you need help doing a task, you'll find step-by-step instructions in this guide.

Technical and Teacher Support

For help with SPARKvue and other PASCO products, you can contact PASCO's Technical and Teacher Support staff by phone, email, or on the Web.

Phone: 1-800-772-8700 (in the U.S.)

+1 916 786 3800 (worldwide)

Email: support@pasco.com

Web: www.pasco.com/support

Starting an experiment

Installing SPARKvue

1. Download SPARKvue from www.pasco.com/sparkvue or insert the SPARKvue installation disc into your computer.

2. Follow the instructions provided with the download or disc to complete the installation.

Connecting an interface and sensors to your computer

SPARKvue software running on your computer receives data from one or more interfaces connected to your computer. Each interface collects data through one or more sensors connected to it.

SPARKvue is compatible with several types interface including SPARKLink, SPARK Science Learning System, USB Link, PowerLink, Xplorer GLX, and Xplorer datalogger. To collect data with SPARKvue, you will need at least one of these interfaces connected to your computer.

You can connect multiple interfaces to one computer in order to do an experiment that requires more sensors than can be connected to a single interface. The interfaces can be of the same type or different types.

Find the section below specific to your interface and follow the instructions to connect the interface to your computer and connect sensors to the interface.

SPARK Science Learning System

The SPARK Science Learning System (SPARK) includes ports for two PASPORT sensors, a temperature probe, and a voltage probe. When it is not connected to a computer, the device records data and displays it on its own screen; however, when connected to a computer, it passes data through to be

recorded and displayed on the computer. It is powered either by its AC adapter, or by its rechargeable battery.

Connecting a SPARK Science Learning System to your computer

1. Use an A-to-mini-B USB cable (such as PASCO part PS-2528) to connect the smaller USB port of the SPARK to a USB port on your computer (or a USB hub connected to the computer).

2. Connect the AC adapter (included with the SPARK) to a wall outlet and to the AC adapter port on the bottom of the SPARK.

    You can skip this step if the SPARK's battery is charged and you wish to let it run on battery power.

3. Press and hold the power button.

    The SPARK turns on and boots up.

1. AC adapter port. **2.** Power button.

Connecting sensors to the SPARK Science Learning System

1. PASPORT ports. **2.** Temperature port. **3.** Voltage port.
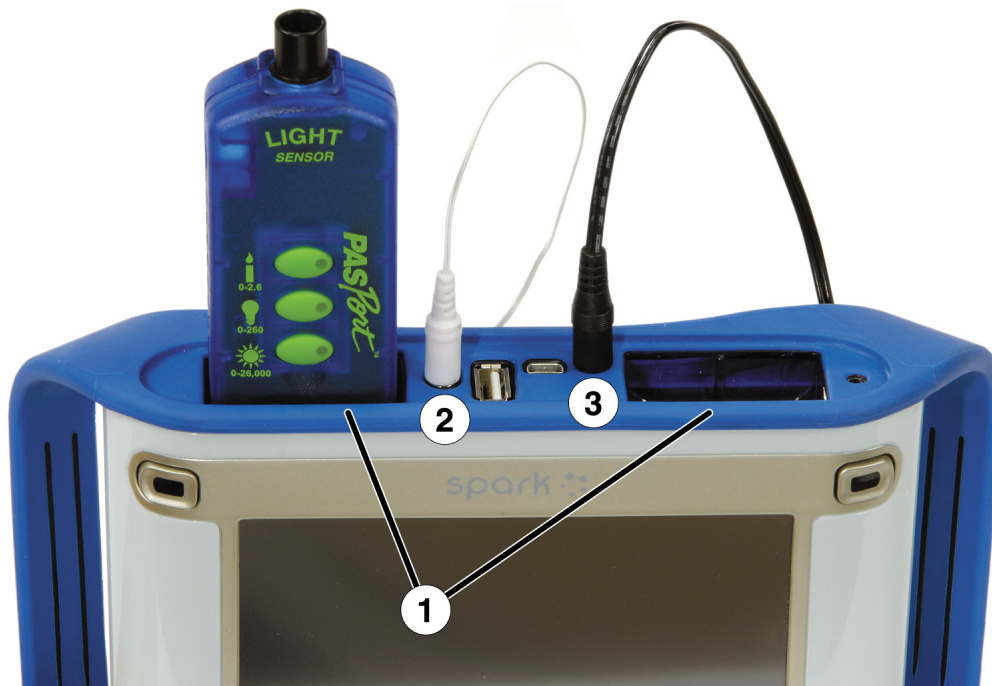
You can use up to two PASPORT sensors plus a temperature probe and a voltage probe.

Complete one or more of the following tasks to connect sensors to the SPARK.

Connecting PASPORT sensors

1.   Plug a PASPORT sensor into one of the PASPORT ports on the top of the SPARK.

2.   Optionally, plug a second PASPORT sensor into the other PASPORT port.

Connecting a temperature probe

•   Plug the included fast-response temperature probe (or other type of temperature probe) into the temperature port on the top of the SPARK.

Connecting a voltage probe

•   Plug the included voltage probe into the voltage port on the top of the SPARK.

Xplorer GLX

The Xplorer GLX includes ports for four PASPORT sensors, two temperature probes, and a voltage probe. When it is not connected to a computer, the device records data and displays it on its own screen; however, when connected to a computer, it passes data through to be recorded and displayed on the computer. It is powered either by its AC adapter, or by its rechargeable battery.

Connecting the Xplorer GLX to your computer

1. Use USB cable (included with the GLX) to connect the smaller USB port of the GLX to a USB port on your computer (or a USB hub connected to the computer).

2. Connect the included AC adapter to a wall outlet and to the AC adapter port on the right side of the GLX.

   You can skip this step if the GLX's battery is charged and you wish to let it run on battery power.

3. Press and hold the power button.

   The GLX turns on and boots up. If SPARKvue is running, the GLX screen displays a message indicating that it is connected.

Connecting sensors to the Xplorer GLX

You can use up to four PASPORT sensors plus two temperature probes and a voltage probe.

Complete one or more of the following tasks to connect sensors to the GLX.

Connecting PASPORT sensors

1. Plug a PASPORT sensor into one of the PASPORT ports on the top of the GLX.

2. Optionally, plug additional PASPORT sensors into the other PASPORT ports.

Connecting temperature probes

1. Plug one of the included fast-response temperature probes (or another type of temperature probe) into one of the temperature ports on the left side of the GLX.

2. Optionally, plug a second temperature probe into the other temperature port.

Connecting a voltage probe

- Plug the included voltage probe into the voltage port on the left side of the GLX.

Xplorer datalogger

The Xplorer datalogger contains a single port for a PASPORT sensor. When it is not connected to a computer, the device records data and displays it on its own screen; however, when connected to a computer, it passes data through to be recorded and displayed on the computer. When connected to a computer, it is powered by the USB port, and it does not require batteries.

1. Use the included USB cable to connect the Xplorer to a USB port on your computer (or a powered USB hub connected to the computer).

2. Connect a PASPORT sensor to the Xplorer.

PowerLink

The PowerLink contains ports for up to three PASPORT sensors. It also includes two USB ports that other interfaces can be connected to. It is powered by its AC adapter, or by replaceable batteries.

1. Connect the AC adapter (included with the PowerLink) to a wall outlet and to the AC adapter port on the back of the PowerLink, or install two "C" batteries in the PowerLink.

2. Use the included USB cable to connect the PowerLink to a USB port on your computer (or a USB hub connected to the computer).

3. Connect up to three PASPORT sensors to the PowerLink.

USB Link

The USB Link contains a single port for a PASPORT sensor.

1. Connect the USB Link to a USB port on your computer (or a powered USB hub connected to the computer).

2. Connect a PASPORT sensor to the USB Link.

Launching SPARKvue

- Click the **SPARKvue** icon on the desktop to launch SPARKvue.

Monitoring live data

Live data from all connected sensors are displayed whenever the Home screen is open.

The Home screen is the first screen that appears when SPARKvue starts.

If the Home screen is not visible, click the **Home** button to return to the Home screen.

Moving on from the Home screen

With the Home screen displayed, you are ready to move into a SPARKlab. A SPARKlab is a multi-page environment where your science investigation takes place.

Complete one of the following tasks to open an embedded SPARKlab, show a measurement in a SPARKlab, or build a custom SPARKlab.

Opening a SPARKlab

SPARKvue includes six embedded SPARKlabs. Complete these steps to open a SPARKlab:

1. Connect the sensors required for the SPARKlab that you wish to do.

2. If there are unneeded sensors connected, disconnect them.

3. In the Home screen, click **Open**.

   The Open window appears.

4. Navigate to the folder containing the SPARKlab that you would like to open.

5. Click the SPARKlab.

6.   Click **Open**.

The SPARKlab opens.

Follow the on-screen instructions to continue your science investigation. Click the **Page Navigator** to turn pages.

Showing a SPARKlab

A show-path SPARKlab is the fastest way to record data and display it in a graph, table, digits display, and meter. Complete these steps to show a SPARKlab:

1.   Connect a sensor.

2.   In the Home screen, click the measurement that you would like to show.
      The selected measurement is highlighted.

3.   Click **Show**.

      *A measurement must be selected for **Show** to be available.*

A four-page SPARKlab opens.

Click the **Start** button to record data.

Click the **Page Navigator** to see your data in the different displays.

Building a SPARKlab

When you build a custom SPARKlab, you design each page with your choice of measurements and displays. You can also add text and pictures. Complete these steps to start building a SPARKlab:

1.   Connect a sensor (or sensors).

2.   In the Home screen, click **Build**.
      The Page-build screen opens.

Page-build screen: 1. Measurements. **2.** Data display, image box, text box, and spacer buttons. **3.** Preview.

3.   Click the measurement (or measurements) that you would like to show in the first data display.

Selected measurements are highlighted. Click a measurement again to clear a selection.

4.   Click one of the data display buttons for a graph, table, digits display, or meter.

Data display buttons: graph, digits display, table, and meter.

If you select just one measurement, all data displays are available. If you select two measurements, only the graph and table are available. If you select three or more measurements, only the table is available.

The measurements and display that you have selected appear in the preview section of the page-build screen.

5.   Optionally, do any of the following:

•   Repeat the steps above to select more measurements and add another data display.

•   Click one of the image box buttons to add a large or small image box. (After the page has been added to the SPARKlab, you can click the image box to select an image to display in the box.)

•   Click one of the text box buttons to add a large or small text box. (After the page has been added to the SPARKlab, you can click the text box to enter text.)

•   Click the **Undo** button to remove an element from the preview.

6.   When you are satisfied with the preview and ready to build your page, click **OK**.

Your new SPARKlab opens showing the page that you have just built.

Click the **Start** button to record data.

Click the **New Page** button to build another page and add it to your SPARKlab.

Setting up an experiment

Customizing data collection

You can start recording data using the default settings, or complete one or more of the following tasks to change the sampling rate or sampling mode.

Setting the sample rate

With SPARKvue in periodic sampling mode (the default mode), complete these steps to set how many data points are recorded each second or how much time elapses between data points:

1.   Click the **Sampling Options** button.

The Sampling Options screen opens.

2.   Click the **Sample Rate Unit:** box and select **Hz**, **seconds**, **minutes**, or **hours**.

3.   Click the **Sample Rate:** box and select a value.

4.   Click **OK**.

Putting SPARKvue into periodic sampling mode

In periodic sampling mode (the default mode, sometimes known as "continuous" mode), SPARKvue records data points at regular intervals. If SPARKvue is in manual sampling mode, complete these steps to put it into periodic sampling mode:

1.   Click the **Sampling Options** button.

The Sampling Options screen opens.

2.   Click **Periodic**.

3.   Click **OK**.

Putting SPARKvue into manual sampling mode

In manual sampling mode, a single value from each measurement is recorded each time you manually trigger SPARKvue. Complete these steps to put SPARKvue into manual sampling mode:

1.   Click the **Sampling Options** button.

The Sampling Options screen opens.

2.   Click **Manual**.

3.   Click **OK**.

Setting an automatic stop condition

When a stop condition is set, SPARKvue automatically stops recording data after a set time interval. Complete these steps to set a stop condition:

1.   Click the **Sampling Options** button.

The Sampling Options screen opens.

2.   Under **Automatic Stop Condition**, click the **Condition:** box and select **Stop after duration**.

3.   Click the **Value:** box and enter a time value.

4.   Click the **Units:** box and select units of time.

5.   Click **OK**.

Customizing how numbers are displayed

Setting the number of decimal places displayed

1.   Click the **Experiment Tools** button.

The Experiment Tools screen opens.

2.   Click **DATA PROPERTIES**.

The Data Properties screen opens.

3.	Click the **Measurement:** box and select a measurement or other variable.

4.	Click **Number Format**.

	The number format options appear.

5.	Click the **Number Style:** box and select **Fixed Precision**.

6.	Use the **Digits:** arrows to select the number of digits to be displayed after the decimal point.

7.	Click **OK**.

Setting the number of significant figures displayed

1.	Click the **Experiment Tools** button.

	The Experiment Tools screen opens.

2.	Click **DATA PROPERTIES**.

	The Data Properties screen opens.

3.	Click the **Measurement:** box and select a measurement or other variable.

4.	Click **Number Format**.

	The number format options appear.

5.	Click the **Number Style:** box and select **Significant Figures**.

6.	Use the **Digits:** arrows to select the number of significant figures to be displayed.

7.	Click **OK**.

Displaying numbers in scientific notation

1.	Click the **Experiment Tools** button.

	The Experiment Tools screen opens.

2.	Click **DATA PROPERTIES**.

	The Data Properties screen opens.

3.	Click the **Measurement:** box and select a measurement or other variable.

4.   Click **Number Format**.

      The number format options appear.

5.   Click the **Number Style:** box and select **Scientific Notation**.

6.   Use the **Digits:** arrows to select the number of digits to be displayed.

7.   Click **OK**.

Changing the units of a measurement

Do one or both of the following tasks to select different units for a measurement.

Changing the units of a measurement in an existing display

Complete these steps to change the units of a measurement displayed in an existing graph, digits display, table, or meter:

1.   Click the **Tools** button of a graph, digits display, table, or meter to open the tools palette.

2.   Click the **Properties** button to open the Properties screen.

3.   Click the **Units:** box and select a unit of measure.

4.   Click **OK**.

The display shows the measurement with the selected units.

Changing the default units of a measurement

Complete these steps to change the units that will be used by default when you select a measurement in the future:

1.   Click the **Experiment Tools** button to open the Experiment Tools screen.

2.   Click **DATA PROPERTIES** to open the Data Properties screen.

3.   Click the **Measurement:** box and select a measurement.

4.   Click the **Units:** box and select units of measure.

5.   Click **Set As Default** to select it.

When **Set As Default** is selected, it is highlighted.

6.   Click **OK**.

The next time you select that measurement for display, it will appear with the units that you selected.

Calibrating sensors

Sensor calibration is an optional step that can help to make measurements more accurate.

Complete the following tasks to select a measurement and calibration type and perform a calibration.

Selecting a measurement to calibrate and a calibration type

1.   Click the **Experiment Tools** button.

The Experiment Tools screen opens.

2.   Click **CALIBRATE SENSOR**.

The Calibrate Sensor: Select Measurement screen opens.

3.   Click the **Sensor:** box and select the sensor to be calibrated.

4.   Click the **Measurement:** box and select the measurement to be calibrated.

5.   Click the **Calibration Type:** box and select a calibration type.

See the instructions provided with your sensor for information about what type of calibration is appropriate for your sensor.

6.   Click **NEXT**.

The Calibrate Sensor: Enter Values screen opens.

Now that you have selected a measurement, you can perform a calibration as described in the next task.

Performing a calibration

After you have selected a measurement to be calibrated and a calibration type (see previous task), you are ready to perform a calibration.

Depending on the calibration type that you have selected, perform a 2-point calibration, a 1-point offset-only calibration, or a 1-point slope-only calibration.

Performing a 2-point calibration

In the Calibrate Sensor: Enter Values screen, complete these steps:

1.   Apply a known quantity to the sensor.

     For example, place a pH probe in a pH 4 buffer solution.

2.   Under **Calibration Point 1** click the **Standard Value:** box and enter the known value.

     For example, enter the known pH of the buffer solution.

3.   Under **Calibration Point 1** click **Read From Sensor**.

     The value measured by the sensor is transferred to the **Sensor Value:** box.

4.   Apply a different known quantity to the sensor.

     For example, place the pH probe in a pH 7 buffer solution.

5.   Under **Calibration Point 2** click the **Standard Value:** box and enter the known value.

     For example, enter the known pH of the buffer solution.

6.   Under **Calibration Point 2** click **Read From Sensor**.

     The value measured by the sensor is transferred to the **Sensor Value:** box.

7.   Click **OK**.

Calibration is complete.

Performing a 1-point offset-only calibration

In the Calibrate Sensor: Enter Values screen, complete these steps:

1.   Apply a known quantity to the sensor.

     For example, place a temperature probe in ice water known to be 0 ℃.

2.   Under **Calibration Point 1** click the **Standard Value:** box and enter the known value.

     For example, enter the known temperature of the water.

3.   Under **Calibration Point 1** click **Read From Sensor**.

     The value measured by the sensor is transferred to the **Sensor Value:** box.

4. Click **OK**.

Calibration is complete.

Performing a 1-point slope-only calibration

In the Calibrate Sensor: Enter Values screen, complete these steps:

1. Apply a known quantity to the sensor.

   For example, place a dissolved oxygen probe in a bottle known to contain 9.1 mg/L of dissolved oxygen.

2. Under **Calibration Point 2** click the **Standard Value:** box and enter the known value.

   For example, enter the known dissolved oxygen concentration.

3. Under **Calibration Point 2** click **Read From Sensor**.

   The value measured by the sensor is transferred to the **Sensor Value:** box.

4. Click **OK**.

Calibration is complete.

Using sensor adapters

Connecting a sensor through a Digital Adapter or Photogate Port

The Digital Adapter (PASCO part PS-2159) allows digital switch-type sensors such as photogates and smart pulleys to be connected to a PASPORT interface and used with SPARKvue. It also allows the use of a *ScienceWorkshop* Motion Sensor (CI-6742A) or Rotary Motion Sensor (CI-6538).

The Photogate Port (PS-2123) is a type of adapter that supports switch-type sensors, but not the Rotary Motion Sensor or Motion Sensor.

Complete these steps to connect and configure a sensor with a Digital Adapter or Photogate Port:

1. Connect the adapter to your PASPORT interface.

2. Connect a digital sensor to the adapter.

   You can connect a switch-type sensor to either port of the adapter.

   If you are connecting a Motion Sensor or Rotary Motion Sensor, connect the yellow plug to Port 1 and the black plug to Port 2.

   A list of digital sensors and sensor configurations appears.

3.   Optionally, connect a second switch-type sensor to the other port of the adapter.

4.   In the list, click one of the sensors or configurations to select it and click **OK**.

      You may need to click the arrows to scroll the list.

5.   If SPARKvue prompts you to enter one or more measurements specific to your equipment, enter the value or values and click **OK**.

      The measurements that you enter will be used to compute data such as the velocity of an object passing through a photogate.

Connecting a sensor through an Analog Adapter

The Analog Adapter (PASCO part PS-2158) allows analog *ScienceWorkshop* sensors to be connected to a PASPORT interface and used with SPARKvue.

Complete these steps to connect and configure a sensor with an Analog Adapter:

1.   Connect the Analog Adapter to your PASPORT interface.

2.   Connect an analog sensor to the adapter.

      A list of sensors appears.

3.   Click one of the sensors to select it and click **OK**.

      You may need to click the arrows to scroll the list.

4.   Optionally, click the **Gain:** box and select a gain setting.

5.   Click **OK** again.

Data recording

The following tasks describe how to record a data run with SPARKvue in periodic sampling mode and manual sampling mode. Over the course of a science investigation, you can record multiple data runs and sets.

Recording a run of periodically sampled data

With SPARKvue in periodic sampling mode (the default mode, sometimes known as "continuous" mode), complete these steps to record a data run:

1. Click the **Start** button.

   SPARKvue creates a new data run and starts recording data points into it.

2. To stop recording data, click the **Stop** button.

   SPARKvue stops recording data.

Repeat these steps to record another data run.

Recording a set of manually sampled data

To record manually sampled data, first put SPARKvue into manual sampling mode. See "Putting SPARKvue into manual sampling mode" on page 14.

In manual sampling mode, a single value from each measurement is recorded each time you manually trigger SPARKvue. A series of values is recorded in a

data set. Complete these steps to start a data set, trigger points to be recorded, and close the data set:

1. Optionally, turn to a page in your SPARKlab where you will be able to see your data in a table.

    You can record data with any type of display visible (or no display at all), but it is typical to record manually sampled data while looking at a table.

2. Click the **Start** button.

    SPARKvue creates a new data set. Live data appear in the data displays.

3. When you are ready to record a data point, click the **Keep** button.

    SPARKvue records a single value from each measurement.

4. Repeat the previous step as many times as necessary to record all of the data that you want in the data set.

5. When the entire set has been recorded, click the **Stop** button.

    The data set closes.

Repeat these steps to record another data set.

Deleting data runs

1. Click the **Experiment Tools** button.

    The Experiment Tools screen opens.

2. Click **MANAGE RUNS**.

    The Manage Runs screen opens.

3.   Do one of the following:

- Click **Delete Last Run**.
- Click **Delete All Runs**.
- Click **Delete Run…** and select the run that you want to delete.

4.   Click **Done**.

5.   Click **OK**.

Data display

Displaying data in a graph

Creating a new graph

To create a new graph, do one of the following:

- If the Home screen is visible, create a new SPARKlab:
  a. Click a measurement.
  b. Click **Show**.

  A graph appears on page 1 of the SPARKlab.

- If a SPARKlab is open, add a new page:
  a. Click the **New Page** button.

  The Page-build screen opens.
  b. Click a measurement (or two measurements).
  c. Click the **Graph** button.

  d. Click **OK**.

  A new page containing a graph is added to the SPARKlab.

Showing and hiding the graph tool palette

- To show the tool palette, click the blue **Graph Tools** button near the lower left corner of the graph.

- To hide the tool palette, click the orange **Graph Tools** button.

Adjusting the scale of a graph

Do one or more of the following tasks (in any order) to change the range and domain of a graph.

Scaling a graph to fit all data

1.   Click the **Graph Tools** button to open the tool palette.

2.   Click the **Scale-to-fit** button.

The graph adjusts to fit all data (or all highlighted data).

Scaling by direct manipulation

Complete one or more of these steps in any order:

•   Click one of the numbers labeling the x-scale of the graph and drag it left or right.

     The graph expands or contracts horizontally.

•   Click one of the numbers labeling the y-scale of the graph and drag it up or down.

     The graph expands or contracts vertically.

•   Click the middle of the graph and drag it in any direction.

     The graph moves.

1. Expanding and contracting horizontally. **2.** Expanding and contracting vertically. **3.** Moving.
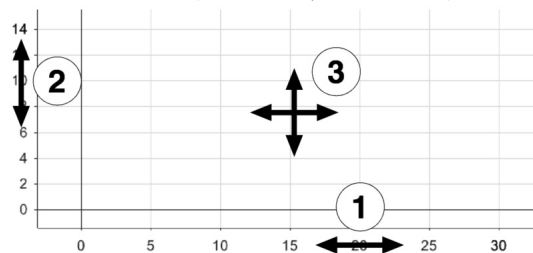
Selecting data to show in an existing graph

Showing and hiding data runs in a graph

1. Click the graph legend.

   The legend enlarges to show available data runs.

2. Select or clear the check box next to each data run that you want to show or hide.

3. Optionally, click outside the legend to reduce the size of the legend.

Graph legend
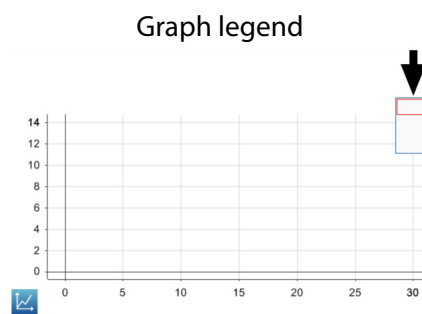
Changing the variable on the x- or y-axis

1. Click the **Graph Tools** button to open the tool palette.

2. Click the **Properties** button to open the Properties screen.

3. For each axis, click the **Measurement:** box and select a measurement or other variable.

Selecting data for operation in a graph

Selecting a data run for operation in a graph

In the graph legend, a red outline surrounds the run that is selected for operation. Complete these steps to change which run is selected:

1. Click the graph legend.

   The legend enlarges.

2.   In the legend, click the symbol (but not the check box) of the run that you want to select.
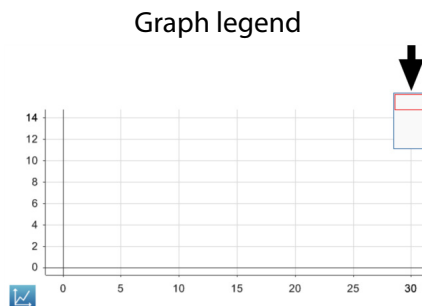
      The red outline moves to the selected run.

Graph legend

When you turn on statistics, graph tools, or curve fits, they are applied to the selected run.

Selecting part of a data run for operation in a graph

If part of a data run is selected for operation, the selected data points are highlighted. Scale-to-fit, statistics, graph tools, and curve fits are applied only to the selected data points. Complete these steps to select part of a data run:

1.   If there is more than one data run on the graph, first select the run from which you will select data points:

      a.   Click the graph legend.

            The legend enlarges.

      b.   In the legend, click the symbol of the run that you want to select.

            The red outline moves to the selected run.

2.   Click the **Graph Tools** button to open the tool palette.

3.   Click the **Select** button.

      The button turns orange.

4. Click somewhere on the graph; then, within one second, click somewhere else on the graph.

   The two locations that you click define the corners of a selection box.

   A selection box appears. Data points inside the box are highlighted.

5. Optionally, adjust the size and position of the selection box by dragging the handles at the corners of the box.

6. When the desired data points are highlighted, click **OK**.

   The selection box disappears, but the points remain selected.

To clear the selection, click the **Select** button again.

Annotating data in a graph

Adding an annotation

1. If there is more than one data run on the graph, first select the run that the annotation will be attached to:

   a. Click the graph legend.

      The legend enlarges.

   b. In the legend, click the symbol of the run that you want to select.

      The red outline moves to the selected run.

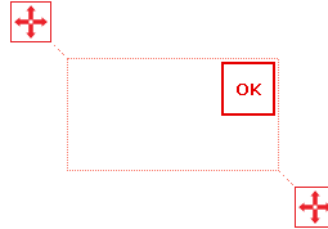2. Click the **Graph Tools** button to open the tool palette.

3. Click the **Select** button.

   The button turns orange.

4. Click a point on the graph.

5. Click **OK**.

6. Click the **Annotation** button.

The on-screen keyboard appears.

7. Enter a note and click **OK**.

An annotation appears on the graph.

8. Click the **Select** button.

The button turns blue.

Editing or deleting an annotation

1. If necessary, click the **Graph Tools** button to open the tool palette.

2. Click the annotation that you want to edit or delete.

The annotation is highlighted.

3. Click the **Annotation** button.

The on-screen keyboard appears.

4. Edit or delete the annotation and click **OK**.

Displaying data in a table

Creating a new table

To create a new table, do one of the following:

- If the Home screen is visible, create a new SPARKlab:
  a. Click a measurement.
  b. Click **Show**.

     A SPARKlab appears.
  c. Click the **Page Navigator** to turn to the table on page 3 of the SPARKlab.

- If a SPARKlab is open, add a new page:

  a. Click the **New Page** button.

  The Page-build screen opens.

  b. Click a measurement (or up to six measurements).

  c. Click the **Table** button.

  d. Click **OK**.

  A new page containing a table is added to the SPARKlab.

Showing and hiding the table tool palette

- To show the tool palette, click the blue **Table Tools** button near the upper left corner of the table.

- To hide the tool palette, click the orange **Table Tools** button.

Scrolling a table

- Click the middle of the table and drag it up or down.

Selecting data to show in an existing table

Selecting a run for display in an existing column

1. Click the run number at the top of the column.

   A list of available runs appears.

2. Click the run that you want to see.

Changing the variable displayed in an existing column

1. Click the **Table Tools** button to open the tool palette.

2. Click the **Properties** button to open the Properties screen.

3. Click the **Column:** box and select the column that you want to change.

   Columns are number 1, 2, 3, *etc.* from left to right.

4. Click the **Measurement:** box and select the measurement or other variable that you want to see.

5. Click **OK**.

Adding a column

A table can contain up to six columns. Complete these steps to add a column to a table:

1. Click the **Table Tools** button to open the tool palette.

2. Optionally, select a position in the table where the new column will be inserted:

   a. Click the **Select** button.

      The button turns orange.

   b. Click the column to the right of where you want the new column to appear.

   If you do not select a position, the new column will be added to the right side of the table.

3. Click the **Add Column** button.

A new, empty column is added to the table.

Click the **Properties** button to select a measurement or other variable to display in the new column.

Removing a column

1. Click the **Table Tools** button to open the tool palette.

2. Click the **Select** button.

The button turns orange.

3. Click the column that you want to remove.

4. Click the **Remove Column** button.

Selecting cells for operation in a table

If a group of table cells is selected for operation, the selected cells are outlined. If statistics are displayed, they apply only to the data in the selected cells. Complete these steps to select cells:

1. Click the **Table Tools** button to open the tool palette.

2. Click the **Select** button.

The button turns orange.

3. On the table, drag down a column, across a row, or diagonally across rows and columns to select a group of cells.

The selected group of cells is outlined.

1. Selecting cells in a single column. **2.** Selecting cells in a single row.
3. Selecting cells in multiple columns and rows.

To clear the selection, click the **Select** button again.

Displaying data in a digits display

Creating a new digits display

To create a new digits display, do one of the following:

• If the Home screen is visible, create a new SPARKlab:

    a.   Click a measurement.

    b.   Click **Show**.

        A SPARKlab appears.

    c.   Click the **Page Navigator** to turn to the digits display on page 2 of the
        SPARKlab.

• If a SPARKlab is open, add a new page:

    a.   Click the **New Page** button.

        The Page-build screen opens.

    b.   Click a measurement.

    c.   Click the **Digits Display** button.

    d.   Click **OK**.

    A new page containing a digits display is added to the SPARKlab.

Showing and hiding the digits display tool palette

- To show the tool palette, click the blue **Digits Display Tools** button near the lower left corner of the digits display.

- To hide the tool palette, click the orange **Digits Display Tools** button.

Changing the variable in a digits display

1. Click the **Digits Display Tools** button to open the tool palette.

2. Click the **Properties** button to open the Properties screen.

3. Click the **Measurement:** box and select the measurement or other variable that you want to see.

4. Click **OK**.

Displaying data in a meter

Creating a new meter

To create a new meter, do one of the following:

- If the Home screen is visible, create a new SPARKlab:

    a. Click a measurement.

    b. Click **Show**.

       A SPARKlab appears.

    c. Click the **Page Navigator** to turn to the meter on page 4 of the SPARKlab.

- If a SPARKlab is open, add a new page:

  a. Click the **New Page** button.

  The Page-build screen opens.

  b. Click a measurement.

  c. Click the **Meter** button.

  d. Click **OK**.

  A new page containing a meter is added to the SPARKlab.

Showing and hiding the meter tool palette

- To show the tool palette, click the blue **Meter Tools** button near the lower left corner of the meter.

- To hide the tool palette, click the orange **Meter Tools** button.

Adjusting the scale of a meter

Scaling a meter to fit all data

1. Click the **Meter Tools** button to open the tool palette.

2. Click the **Scale-to-fit** button.

The scale of the meter adjusts to fit the currently displayed data run.

Setting the scale of a meter

1. Click the **Meter Tools** button to open the tool palette.

2. Click the **Properties** button to open the Properties screen.

3. For the **Always Scale to Fit:** option select **off**.

4. Click the **Minimum:** box and enter the low value of the desired range.

5. Click the **Maximum:** box and enter the high value of the desired range.

6. Click **OK**.

Changing the variable displayed in a meter

1. Click the **Meter Tools** button to open the tool palette.

2. Click the **Properties** button to open the Properties screen.

3. Click the **Measurement:** box and select the measurement or other variable that you want to see.

4. Click **OK**.

Customizing the appearance of a meter

1. Click the **Meter Tools** button to open the tool palette.

2. Click the **Properties** button to open the Properties screen.

3. Click the **Sweep Range:** box and select **Small Sweep**, **Semicircle**, or **Large Sweep**.

4. Click **OK**.

Data analysis

In any display, you can view the statistics of data runs, including minimum value, maximum value, mean value, standard deviation, and count (or number of points). In a graph, the area statistic is also available.

A graph also allows you to apply curve fits; draw predictions; and find coordinates, distances, and slopes on data plots.

Analyzing data in a graph

Viewing statistics in a graph

Complete these steps to see the minimum, maximum, mean, standard deviation, count, and area-under-the-curve of a data run:

1. If more than one data run is displayed, first select a run:
    a. Click the graph legend.
        The legend enlarges.
    b. In the legend, click the symbol of the run that you want to select.
        The red outline moves to the selected run.
2. Click the **Graph Tools** button to open the tool palette.

3. Click the **Statistics** button to open the Statistics screen.

4. Click one or more of the statistics.
    Selected statistics are highlighted.
5. Click **OK**.
    Statistics appear on the graph.
6. Optionally, select part of the data set for statistics to be applied to.
    See "Selecting part of a data run for operation in a graph" on page 28.

To remove the statistics, click the **Statistics** button again.

Applying a curve fit

Complete these steps to apply a linear, quadratic, power, inverse, inverse square, or sine fit to a data run:

1.   If more than one data run is displayed, first select a run:
      a.   Click the graph legend.

            The legend enlarges.
      b.   In the legend, click the symbol of the run that you want to select.

            The red outline moves to the selected run.
2.   Click the **Graph Tools** button to open the tool palette.

3.   Click the **Curve Fit** button to open the Curve Fit screen.

4.   Click one curve fit to select it.
5.   Click **OK**.

      The curve and parameters of the curve appear on the graph.
6.   Optionally, select part of the data set for the curve fit to be applied to.

      See "Selecting part of a data run for operation in a graph" on page 28.

Removing a curve fit

1.   Click the **Graph Tools** button to open the tool palette.

2.   Click the **Curve Fit** button.

Drawing a prediction

Complete these steps to manually sketch on a graph:

1.   Click the **Graph Tools** button to open the tool palette.

2.   Click the **Prediction** button.

3.   Do one of the following:

   •   Trace a continuous curve on the graph.

   •   Click several locations on the graph to draw a series of connected
          points.

4.   Click **OK**.

To delete the prediction, click the **Prediction** button again.

Finding the x- and y-values of a point

Complete these steps to select a point on a graph and display its coordinates:

1.   If more than one data run is displayed, first select a run:

   a.   Click the graph legend.

         The legend enlarges.

   b.   In the legend, click the symbol of the run that you want to select.

         The red outline moves to the selected run.

2.   Click the **Graph Tools** button to open the tool palette.
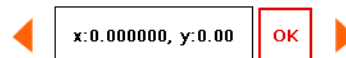

3.   Click the **Select** button.

      The button turns orange.

4.   Click a point on the graph.

      The x- and y-values of the selected point are displayed.

5.   Optionally, click the arrows of the point selector to change which point
      is selected.

Click the **Select** button again to clear the selection.

Finding the x- and y-difference between two points

Complete these steps to select a range of points and display the change-in-x and change-in-y between the first and last points in the selected range:

1. If more than one data run is displayed, first select a run:
    a. Click the graph legend.

        The legend enlarges.
    b. In the legend, click the symbol of the run that you want to select.

        The red outline moves to the selected run.

2. Click the **Graph Tools** button to open the tool palette.

3. Click the **Select** button.

    The button turns orange.

4. Click somewhere on the graph; then, within one second, click somewhere else on the graph.

    The two locations that you click define the corners of a selection box.

    A selection box appears. Data points inside the box are highlighted.

5. Optionally, adjust the size and position of the selection box by dragging the handles at the corners of the box.

6. When the desired data points are highlighted, click **OK**.

    The selection box disappears, but the points remain selected.

7. Click the **Coordinates** button.

An annotation with the following information appears on the graph:

- The x- and y-values of the first point in the selected range (*x1* and *y1*),

- The x- and y-values of the last point in the selected range ($x2$ and $y2$), and
- The x- and y-differences between those two points (dx and dy).

To clear the annotation, click the **Coordinates** button again. To clear the selection, click the **Select** button again.

Finding the slope at a point on a data plot

Complete these steps to display the slope at a selected point:

1. If more than one data run is displayed, first select a run:

   a. Click the graph legend.

      The legend enlarges.

   b. In the legend, click the symbol of the run that you want to select.

      The red outline moves to the selected run.

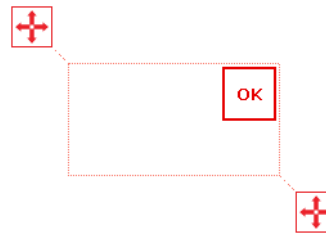2. Click the **Graph Tools** button to open the tool palette.
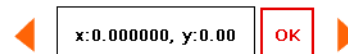

3. Click the **Slope Tool** button.

   The Slope Tool appears on the graph displaying the slope at one point.

   The Slope Tool appears in the middle of the data run or, if part of the data run has been selected, in the middle of the selected part. See "Selecting part of a data run for operation in a graph" on page 28.

4. Click the arrows of the point selector to move the slope tool to nearby points.

To hide the Slope Tool, click the **Slope Tool** button again.

Viewing statistics in a table

Complete these steps to see the minimum, maximum, mean, standard deviation, and count of data runs:

1. Click the **Table Tools** button to open the tool palette.

2.   Click the **Statistics** button to open the Statistics screen.

$$\Sigma$$

3.   Click one or more of the statistics.

Selected statistics are highlighted

4.   Click **OK**.

Statistics appear at the bottom of each column.

5.   Optionally, select a group of cells for statistics to be applied to.

See "Selecting cells for operation in a table" on page 33.

Click the **Statistics** button again to remove the statistics.

Viewing statistics in a digits display

Complete these steps to see the minimum, maximum, mean, standard deviation, or count of a data run:

1.   Click the **Digits Display Tools** button to open the tool palette.

1.23

2.   Click the **Statistics** button to open the Statistics screen.

$$\Sigma$$

3.   Click one of the statistics to select it.

4.   Click **OK**.

The selected statistic appears in the digits display (instead of the most recently collected value that normally appears).

Click the **Statistics** button again to return the digits display to normal.

Viewing statistics in a meter

Complete these steps to see the minimum, maximum, mean, standard deviation, or count of a data run:

1. Click the **Meter Tools** button to open the tool palette.

2. Click the **Statistics** button to open the Statistics screen.

3. Click one of the statistics to select it.

4. Click **OK**.

The meter indicates the selected statistic (instead of the most recently collected value that it normally indicates).

Click the **Statistics** button again to return the meter to normal.

Calculations and manually entered data

Working with calculations

Opening the calculator screen

1. Click the **Experiment Tools** button.

    The Experiment Tools screen opens.

2. Click **CALCULATED DATA**.

    The calculator screen opens.

Creating a calculation

Complete one or more of the following steps in any order to enter an expression in the calculator screen:

- To start a new expression, click **Insert**.

- To insert a measurement into the expression, click **Measurements**.

- To cycle through the various functions available for use in the expression, click the button under **Functions:**.

- If the expression contains a trigonometric function, select **RAD** or **DEG** to indicate how angles are measured.

- To enter words or letters into the expression, click the **Letters** button.

- To enter Greek letters into the expression, click the **Greek Letters** button.

    αβγ

    Click **CAPS** or **SHIFT** to switch between lowercase and uppercase Greek letters.

- To enter subscript and superscript numbers, use the number keys on the Greek keyboard. Click **SHIFT** to switch between subscript and superscript.

- Click the **Numbers** button to return to the main calculator keyboard.

    123

- When you have finished entering the expression, click **RETURN**.

    SPARKvue may prompt you to enter definitions for variables and constants used in the expression.

- To exit the calculator screen, click **Done**.

Displaying a calculation

Once you have created a calculation, it is available to be shown in any data display. Complete these steps to select the calculation for display.

1. Click the **Tools** button of a graph, digits display, table, or meter to open the tools palette.

2. Click the **Properties** button to open the Properties screen.

3. Click the **Measurement:** box and select the calculation.

4. Click **OK**.

Entering data manually

These steps outline the process of manual data entry.

See the following tasks for detailed instructions.

1. Open the measurements list in the Page-build screen or the Table Properties screen.

2. Create a empty data set for number or text data entry.

3. Prepare a table for data entry.

4. Enter data in the table.

5. Optionally, display the entered data in other displays.

6. Optionally, edit any manually entered number or text.

Opening the measurements list

Do one of the following to open the measurements list:

- If the Home screen is open, click **Build**.

    The Page-build screen containing the measurements list opens.

- If a SPARKlab is open and you want to enter data into a *new* table, click the **New Page** button.

    The Page-build screen containing the measurements list opens.

- If you want to enter data into an *existing* table, complete these sub-steps:

    a. Click the **Table Tools** button to open the tool palette.

    b. Click the **Add Column** button to add a new empty column.

    c. Click the **Properties** button to open the Properties screen.

    d. Click the **Measurement:** box to open the measurement list.

    The measurement list opens.

Now that the measurement list is open, you can create an empty data set as described in the next task.

Creating a data set for manual entry

Complete one of the following tasks.

Creating a data set for manually entered numbers

1. In the measurement list under **Experiment Clock**, click **Create Data Set**.

   The Define the Data Set screen opens.

2. Click the **Measurement Name:** box and enter a name for the new data set.

3. Optionally, click the box and enter the name of the units.

4. Click **OK**.

Creating a data set for manually entered text

1. In the measurement list under **User-entered Text Data**, click **Create Data Set**.

   The Define the Data Set screen opens.

2. Click the **Measurement Name:** box and enter a name for the new data set.

3. Click **OK**.

Preparing a table for manual data entry

After you have completed the previous task, either the Page-build screen or the Table Properties screen appears. Depending on which screen you see, do one of the following:

• If the Table Properties screen is open, click **OK**.

   The table appears displaying the empty data set ready for data entry.

- If the Page-build screen is open, build a page containing the empty data set displayed in a table:

  a.   In the measurement list, click the data set that you just created to select it.

  b.   Click the **Table** button.

  c.   Click **OK**.

  A new table appears displaying the empty data set ready for data entry.

Entering data into a manual data set

After creating a data set as described in the previous tasks, complete these steps to enter data:

1.   If the table tool palette is not already open, click the **Table Tools** button.

2.   Click the **Select** button.

3.   Enter data in a cell:

  a.   Click the first table cell where you want to enter data.

  b.   Click the **Data Entry** button and enter a number or text (depending on what type of data set you created).

4.   Repeat the previous step to enter data in other cells.

Displaying manually entered data

Once you have created a data set, it is available to be shown in any data display such as a graph. Complete these steps to select the data set for display.

1.   Click the **Tools** button of a graph, digits display, table, or meter to open the tools palette.

2.   Click the **Properties** button to open the Properties screen.

3.   Click the **Measurement:** box and select the data set.

4.   Click **OK**.

Editing manually entered data

1.   If the table tool palette is not already open, click the **Table Tools** button.

2.   Click the **Select** button.

3.   Click the table cell containing the data that you want to change.

4.   Click the **Data Entry** button and change or delete the number or text.
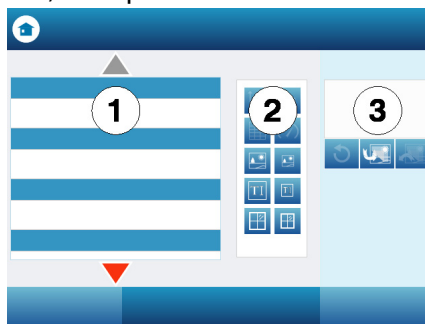
Building SPARKlab pages

Starting a new SPARKlab page

Complete one of these steps to start building a new page:

•   From the Home screen, click **Build**.

•   From within an existing SPARKlab, click the **New Page** button.

The Page-build screen appears.

Page-build screen: 1. Measurements. **2.** Data display, image box, text box, and spacer buttons. **3.** Preview.

About adding elements to a SPARKlab page

A SPARKlab page is built by adding elements one at a time in the Page-build screen. As elements are added, they are shown in the preview section of the Page-build screen.

Each page can contain multiple displays, images, and text boxes. A page can also contain spacers, which are transparent place-holding elements that allow the background image to show. The maximum number of elements on a page depends on the sizes of the elements.

A page can contain:

•   up to two large elements,

- up to six small elements, or

- one large element and up to two small elements.

The large elements are:

- graphs,

- tables,

- large image boxes,

- large text boxes, and

- large spacers.

The small elements are:

- digits displays,

- meters,

- small image boxes,

- small text boxes, and

- small spacers.

As you add elements to a page, they are automatically arranged and aligned.

Examples of screen layouts: 1. One large or small element. **2.** Two large elements. **3.** Two small elements. **4.** One large and two small elements. **5.** Three small elements. **6.** Six small elements.
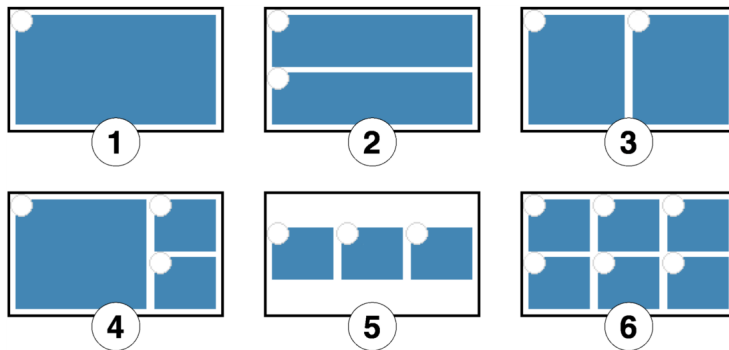
Removing an element

Elements can be removed while the Page-build screen is still open. Elements are removed in the reverse order in which they were added.

- Click the **Undo** button.

The most recently added element is removed from the preview.

Click the **Undo** button again to remove another element.

Adding a display to a SPARKlab page

In the Page-build screen, complete one or more of the following tasks to add displays.

Adding a graph

Complete these steps in the Page-build screen:

1. Click one or two measurements (or other variables) to select them.

   If you select just one measurement, it will be plotted on the y-axis with time on the x-axis. If you select two measurements, the first selected will be plotted on the y-axis, and the second selected will be plotted on the x-axis.

2. Click the **Graph** button.

A graph is added to the preview.

If you have finished adding elements to the page, click **OK** to exit the Page-build screen.

Adding a table

Complete these steps in the Page-build screen:

1. Click one or more measurements or other variables (up to six) to select them.

2.   Click the **Table** button.

A table is added to the preview.

If you have finished adding elements to the page, click **OK** to exit the page-build screen.

Adding a digits display

Complete these steps in the Page-build screen:

1.   Click one measurement or other variable to select it.

2.   Click the **Digits Display** button.

A digits display is added to the preview.

If you have finished adding elements to the page, click **OK** to exit the Page-build screen.

Adding a meter

Complete these steps in the Page-build screen:

1.   Click one measurement or other variable to select it.

2.   Click the **Meter** button.

A meter is added to the preview.

If you have finished adding elements to the page, click **OK** to exit the Page-build screen.

Adding a text box

Start these steps in the Page-build screen:

1. Click the large or small **Text Box** button.

   A text box is added to the preview.

2. Optionally, add other elements to the page.

3. Click **OK**.

   The new page containing the empty text box appears.

4. Click the text box and enter text.

   You can enter text (such as experiment instructions) as part of the initial experiment setup or leave the text box empty as a place to enter notes or answers to questions during the experiment.

Adding an image

To add an image to a SPARKlab page, you first add an image box in the Page-build screen and later load an image from a saved file into the image box.

You can use an image of any size; SPARKvue will resize and stretch it to fit the box. To prevent distortion, use an image with the pixel dimensions of:

- 640 × 354 (full page),

- 640 × 175 (half page horizontal),

- 317 × 354 (half page vertical),

- 417 × 354 (2/3 page), or

- 209 × 175 (1/6 page).

An image of different pixel dimensions but equivalent aspect ratio can also be displayed without distortion.

Start these steps in the Page-build screen:

1. Click the large or small **Image Box** button.

   An image box is added to the preview.

2. Optionally, add other elements to the page.

3.   Click **OK**.

The new page containing the empty image box appears.

4.   On the SPARKlab page, click the image box.

The image palette appears.

5.   Click the **Load** button.

The Open window appears.

6.   Click an image file to select it.

7.   Click **Open**.

The image from the selected file appears in the image box.

8.   Optionally, click the image to hide the image palette.

Removing or replacing an image in a image box

1.   Click the image to open the image palette.

2.   Do one of the following:

- Click the **Remove** button to delete the image.

- Click the **Load** button to load a new image file.

Locking an image

Once an image is locked it cannot be changed or removed. However, the SPARKlab page that contains the locked image can be deleted.

1.   Click the image to open the image palette.

2.   Click the **Lock** button.

Adding a spacer

Complete these steps in the Page-build screen:

1. Click the large or small **Spacer** button.

    A spacer is added to the preview.

2. Optionally, add other elements to the page.

    The space in the preview occupied by the spacer will remain unoccupied by other elements.

3. Click **OK**.

    The new page appears.

Adding a background image

A background image fills the entire SPARKlab page. Elements on the page (data displays, text boxes, image boxes and spacers) are overlaid in front of the background image.

The background image is copied from a saved image file. You can use an image of any size; SPARKvue will resize and stretch it to fit the page. To prevent distortion, use an image with the pixel dimensions of 640×354 (or an aspect ratio of about 1.8:1).

Complete these steps in the Page-build screen:

1. Click the **Add Background** button.

    The Open window appears.

2. Click an image file to select it.

3. Click Open.

The background image is added to the preview.

Before completing the page, there must be at least one element in addition to the background. If you want only the background to appear on the page, add a spacer element.

While the Page-build screen is still open, you can click the **Remove Background** button to remove the background.

Deleting a SPARKlab page

•   While viewing the page in a SPARKlab, click the **Delete Page** button.

Saving and sharing

Saving a SPARKlab

Complete these steps to save your work:

1.   Click the **Sharing** button to open the Sharing screen.

2.   Click **SAVE FILE AS**.

      The Save window opens.

3.   Navigate to the folder where you would like to save the lab.

4.   Enter a file name.

5.   Click **Save**.

6.   Click **Done** to return to your SPARKlab.

After you have saved a file once using the procedure above, you can quickly save the file again by clicking **SAVE FILE** instead of **SAVE FILE AS** in the Sharing screen.

Printing a lab

The SPARKlab cannot be printed directly; however, you can capture SPARKlab pages in the journal and print the journal

Complete these steps to take snapshots of SPARKlab pages and print the snapshots:

1.   On each SPARKlab page that you wish to print, click the **Snapshot** button.

      Each time you click the **Snapshot** button, the Snapshot Quick View appears briefly and an image of the page is added to the journal.

2.   Click the **JOURNAL** tab.

3. Click **PRINT JOURNAL** to open the Print window.

4. Select a printer and click **Print**.

5. Click **Done** to return to your SPARKlab.

Exporting data

When you export data, a tab-delimited text file is saved that can be opened in another program.

Note that exporting data is *not* equivalent to saving the lab. If you plan to later reopen your work in SPARKvue, you must also save the lab.

Complete these steps to export data:

1. Click the **Sharing** button to open the Sharing screen.

2. Click **EXPORT DATA** to open the Export Data window.

3. Navigate to the folder where you would like to save the file.

4. Enter a file name.

5. Click **Save**.

6. Click **Done**.

To view the saved data, open the file in a spreadsheet program, mapping program, word processor, or text editor.

Opening a saved lab

1. If necessary, click the **Home** button to return to the Home screen.

2. In the Home screen, click **Open**.

3. Navigate to the folder where the file is saved.

4. Click the file.

5. Click **Open**.

The lab opens.

Keeping a journal

The journal allows you to keep a record of your work in a series of pictures and captions as your science investigation progresses.

These steps outline the process of keeping a journal. See the following tasks for detailed instructions.

1. Take a snapshot.

    An image of the SPARKlab page is recorded.

2. Optionally, add a caption to the snapshot.

3. Repeat the previous steps at anytime during your science investigation.

4. Save, export, or print the journal.

Taking a snapshot

At any time during your science investigation, complete these steps to save an image of the SPARKlab page.

•   Click the **Snapshot** button.

The SPARK records an image of the SPARKlab page, and the Snapshot Quick View appears briefly.

The Snapshot Quick View

You can let the Snapshot Quick View close automatically or use the buttons in the Snapshot Quick View to open the journal or delete the snapshot.

Opening the journal

- Click the **Journal** button.

Adding a caption to a snapshot or editing an existing caption

- Click inside the caption area and enter or change the caption.

1. Journal entry. **2.** Thumbnails. **3.** Caption area
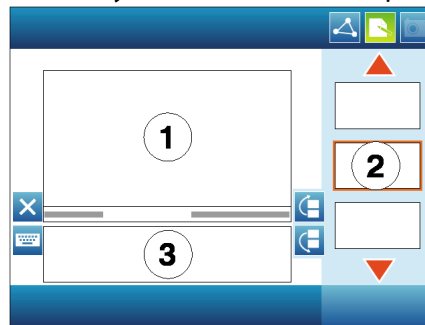
Navigating in the journal

- In the journal, click a thumbnail on the right side of the screen to view a journal entry.
- Click the arrows to scroll through the thumbnails

Deleting a journal entry or snapshot

- In the journal or the Snapshot Quick View, click the **Delete** button to delete the currently visible journal entry.

Rearranging journal entries

- In the journal, click the **Move Journal Entry Up** button or **Move Journal Entry Down** button to change the position of the currently visible entry.

Closing the journal

- Click **Done** to close the journal and return to the SPARKlab.

Saving a journal

Do one of the following to save a journal:

- Save the entire lab.

  See "Saving a SPARKlab" on page 61.

  The journal is saved as part of the lab.

- Export the journal.

  See next task.

  The journal is saved in format that can be viewed in a web browser.

Exporting a journal

When you export a journal, it is saved as a group of files that can be viewed in a web browser.

Note that exporting the journal is *not* equivalent to saving the lab. If you plan to later reopen your work in SPARKvue, you must also save the lab.

Complete these steps to export a journal:

1. If you are currently viewing the journal, click **Done** to return to the SPARKlab.

2.   Click the **Sharing** button to open the Sharing screen.

3.   Click the **JOURNAL** tab.

4.   Click **EXPORT JOURNAL** to open the Save window.

5.   Navigate to the folder where you would like the journal to be saved.

6.   Enter a file name.

7.   Click **Save**.

SPARKvue creates a new folder with the filename that you entered and saves a group of text and image files plus an HTML file in it.

8.   Click **Done** to return to your SPARKlab.

To view the journal, open the HTML file in a web browser.

Printing a journal

1.   If you are currently viewing the journal, click **Done** to return to the SPARKlab.

2.   Click the **Sharing** button to open the Sharing screen.

3.   Click the **JOURNAL** tab.

4.   Click **PRINT JOURNAL** to open the Print window.

5.   Select a printer and click **Print**.

6.   Click **Done** to return to your SPARKlab.

Common tasks

Turning pages

- Click the arrows of the **Page Navigator** to turn to the next page or previous page.

- Click the center of the **Page Navigator** to open a menu from which you can select any page in the SPARKlab.

Returning to the Home screen

- Click the **Home** button to close a SPARKlab and return to the Home screen.

Entering text and numbers using the on-screen keyboard

If you are using SPARKvue on a device without an external keyboard, you can use the on-screen keyboard for text or number input. If you have an external

keyboard, you can type on either the external or on-screen keyboard whenever the on-screen keyboard appears.
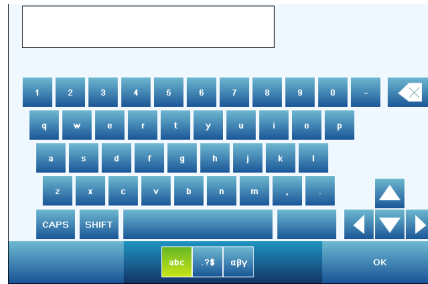
- To enter capital letters, click **CAPS** or **SHIFT**.

- To enter punctuation and other symbols, click the **Punctuation** button.

- To enter Greek letters, click the **Greek Letters** button.

  Click **CAPS** or **SHIFT** to switch between lowercase and uppercase Greek letters.

- To enter subscript and superscript numbers, use the number keys on the Greek keyboard. Click **CAPS** or **SHIFT** to switch between subscript and superscript.

- To start a new line, click **RETURN**.

- When you have finished entering text or a number, click **OK**.

Opening the About SPARKvue screen

1. Click the **About SPARKvue** button to open the About SPARKvue screen.

2. Click **About SPARKvue** to view information about the installed version of SPARKvue.

Using emulation mode

In emulation mode, SPARKvue software emulates the SPARK Science Learning System device. Emulation mode allows teachers to demonstrate SPARK Science Learning System operations on a projected computer screen. Complete these steps to put SPARKvue into emulation mode:

1. Click the **Home** button to return to the Home screen.

2. Click the **Emulation Mode** button.

   The button is highlighted to indicate that SPARKvue is in emulation mode.

To exit emulation mode, return to the Home screen and click the **Emulation Mode** button again.

Setting the language

1. Click the **About SPARKvue** button to open the About SPARKvue screen.

2. Click **Languages**.
3. Click the **Languages** box and select a language.
4. Click **OK**.
5. Click **Done**.
6. Exit SPARKvue and restart it.

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