



Measurement and Data Logging

Level 1

Typically, pupils should show evidence of being able to:

- Take part in a teacher-led discussion about collecting readings using an electronic device or a data logger. *This might include discussing what electronic measurement devices are commonly available.* (Explore)
- Use an electronic device or a data logger to take readings. *This might include using a digital thermometer to record temperature.* (Express)
- Be aware that digital methods can be used to communicate. (Exchange)
- Talk about their work, led by the teacher. (Evaluate)
- Show their recorded data with the teacher's help. (Exhibit)

Level 2

Typically, pupils should show evidence of being able to:

- Choose a suitable electronic device to measure a variable. With the teacher's help, set up an electronic device or a data logger for collecting readings. *This might include selecting suitable electronic devices or data logger sensors to measure temperature, light or other common variables.* (Explore)
- Use an electronic device or a data logger to take readings from a range of different variables and record these in another medium. *This might include recording the temperature at different locations around the school.* (Express)
- Identify and talk about how to use different digital methods to communicate. (Exchange)
- Talk about how to make simple improvements to their work, prompted by the teacher. (Evaluate)
- Save their recorded data and/or show it to the class or group with the teacher's help. (Exhibit)

Level 3

Typically, pupils should show evidence of being able to:

- Research information, from given sources, on available electronic devices or data loggers to measure physical quantities. Use an electronic device or a data logger to measure a physical quantity. *This might include using a data logger and temperature sensor to record temperature at regular intervals over a given time period.* (Explore)
- Display the data the electronic device or data logger has collected. *This might include displaying the data in a table or copying and pasting a chart the data logger has produced into a document.* (Express)



- Use a contemporary digital method to communicate or contribute to a supervised online activity. *This might include sending an email or making a post to a wiki, blog or discussion thread. The email or post might be to a teacher.* (Exchange)
- Make some modifications to improve their work. *This might include improving how the data is displayed in the report.* (Evaluate)
- Save their work with a meaningful filename in an appropriate location. (Exhibit)

Level 4

Typically, pupils should show evidence of being able to:

- Research and select appropriate sensors to measure physical quantities. Use a data logger with appropriate sensors to measure physical quantities in an investigation to solve the problem given in the task brief. *This might include connecting a suitable sensor to a data logger and using it to record data, for example temperature or pH at regular intervals over a chosen time period.* (Explore)
- Create a document to present the data from the investigation in a format showing an awareness of the audience and purpose defined in the task brief. *This might include using appropriate tables and charts to make the information more suitable for the audience and purpose.* (Express)
- Use one or more contemporary digital methods to communicate, exchange and collaborate in supervised online activities. *This might include sending an email with an attachment or making several relevant posts to a wiki, blog or discussion forum.* (Exchange)
- Use appropriate ICT tools and features to improve work. *This might include taking additional readings or changing the time period, documenting the improvements they made to their investigation.* (Evaluate)
- Save the report and data files in a named folder or class e-portfolio. (Exhibit)

Level 5

Typically, pupils should show evidence of being able to:

- Research, select and evaluate appropriate electronic devices or data loggers to measure physical quantities. Use appropriate electronic devices or data loggers to measure physical quantities in an investigation to solve the problem specified in the task brief. *This might include using a data logger with one or more connected sensors to record data at regular intervals over a chosen time period, as part of an investigation.* (Explore)
- Create a report using appropriate software that integrates the data from an investigation, showing a clear understanding of the audience and purpose defined in the task brief. *This might include integrating data into a report, using tables, graphs and charts to present it in a format suitable for the audience and purpose.* (Express)
- Use a range of contemporary digital methods to communicate, exchange and share their work online with their peers. *This might include working online to share data from experiments, or discussing and/or debating online how data should be presented in the report.* (Exchange)



- Use the 'plan, do, review' cycle to improve their work for the audience and purpose defined in the task brief, evaluating the process and outcome. *This might include identifying weaknesses in the investigation and rerunning experiments to confirm results.* (Evaluate)
- Organise, store and maintain the report and any associated files and/or data in a personalised area to showcase learning digitally across the curriculum. (Exhibit)

Level 6

Typically, pupils should show evidence of being able to:

- Research, select and evaluate a range of suitable electronic devices or data loggers to record data in an investigation, justifying their choices. Use, in an investigation, suitable electronic devices and select an appropriate time period for collecting all data, taking into account the specific audience and purpose. *This might include researching similar investigations before selecting appropriate sensors to measure all relevant physical quantities as part of an investigation to solve the problem given in the task brief.* (Explore)
- Identify user requirements and plan and create an investigation targeted at a specific audience and purpose. *This might include clearly documenting planning decisions and using a number of appropriate ways to display data in a meaningful way, such as different charts, formulae, tables or summary data. Spreadsheet software might be used to analyse data for presentation.* (Express)
- Use a range of contemporary digital methods to communicate, exchange and share their information and findings, collaborating with peers, experts and end users. *This might include collaborating on the investigation with peers, for example sharing data in a discussion forum and allowing contributors to use collaborative features of the software to create a joint investigation report.* (Exchange)
- Justify the data logger and sensors they chose to complete the investigation, the alternatives they considered and the process they carried out in the investigation. Justify how their investigation effectively solved the problem for the specified audience and purpose. *This might include describing the development process and identifying how they made value judgements about the reliability of data and used multiple data sets and/or reruns of experiments to improve reliability.* (Evaluate)
- Organise, store and maintain their work in a personalised area to showcase learning digitally across the curriculum. (Exhibit)

Level 7

Typically, pupils should show evidence of being able to:

- Research, select and evaluate appropriate electronic devices to measure physical data, discriminating between these for accuracy and reliability, justifying and referencing their sources. Design a solution in response to a complex problem to meet the needs of a defined end user. *This might include using a wide range of features of data logging equipment to measure and record all relevant data with a high degree of accuracy.* (Explore)



- Set out clearly defined user requirements and plan and develop a thorough investigation to meet the end user's expectations. Use a range of software tools to analyse and manipulate data, generating and presenting information to produce a sophisticated report, which meets the audience's needs. *This might include collecting a range of data and carrying out further detailed analysis, for example using a spreadsheet, to ensure results are valid and reliable. (Express)*
- Exploit contemporary communication methods to exchange, share and collaborate on their investigation with peers, experts and end users, contributing to a collaborative global environment. *This might include uploading investigation data to a shared area online to gather feedback and acquire further data from peers, experts and end users, acting on this in a discriminating way to further enhance the high quality and suitability of the investigation conclusions reported to the end user defined in the task brief. (Exchange)*
- Review systematically, with increasing discernment, the investigation methods and data, considering validity and/or reliability of results and the audience requirements, clearly identifying problems and/or anomalous data. *This might include rerunning and refining experiments where necessary. (Evaluate)*
- Organise, store and retrieve systematically a logically structured digital bank of work to showcase learning across the curriculum, taking account of format, portability and size. *This might include backing up files to an alternative location, including data files for possible future analysis. (Exhibit)*

Pupils should demonstrate, when and where appropriate, knowledge and understanding of e-safety, including acceptable online behaviour.