



ASEAN + KOREA • 40<sup>th</sup> ACT+1 CONVENTION AND PRE-CONVENTION SEMINAR

# Teacher Workflows, Professional Agency & AI Productivity

A Practical Framework for Designing Simulations, Data  
Tools, Scientific Dialogue and Feedback

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*The Engine Room: Teacher Workflows, Professional Agency & AI Productivity*



## INTRODUCTION

# Teacher time and professional judgement

| Workflow                | AI can help with                                              | The teacher leads                                    |
|-------------------------|---------------------------------------------------------------|------------------------------------------------------|
| Lesson design           | Drafting activities, simulations and differentiated questions | Learning goals, sequencing and scientific accuracy   |
| Feedback and assessment | Drafting questions, hints and rubric-based comments           | Assessment standards and interpretation of answers   |
| Student data            | Grouping response patterns and suggesting follow-up tasks     | Diagnosing misconceptions and choosing interventions |



The intended gain: more capacity for relationships, diagnosis and deeper student thinking.



## INTRODUCTION

# Singapore's Student Learning Space (SLS)

SINGAPORE

## Student Learning Space

A national online learning platform for schools in Singapore, developed by the Ministry of Education (MOE) with GovTech. Teachers use curriculum-aligned resources, create and customise lessons, assign work and review students' responses.

| AI feature in SLS                      | What it supports                                         |
|----------------------------------------|----------------------------------------------------------|
| Authoring Copilot (ACP)                | Lesson authoring and generating interactives             |
| Learning Assistant (SALiS)             | Guided dialogue and questioning with pupils              |
| Annotated Feedback Assistant (AFA)     | Targeted annotations, hints and questions                |
| Short Answer Feedback Assistant (SAFA) | Suggested marks and content-related feedback             |
| Data Assistant (DAT)                   | Analysis of qualitative responses for teaching decisions |



## INTRODUCTION

# Inquiry tools teachers can create

| Learning purpose           | Within SLS                                                 | A comparable custom build                                   |
|----------------------------|------------------------------------------------------------|-------------------------------------------------------------|
| Explore a concept          | ACP-generated interactive for simulation-based learning    | GenAI-assisted browser simulation with controlled variables |
| Collect and interpret data | ACP-generated interactive for data entry and visualisation | Input table, automatic means and labelled graphs            |
| Explain the evidence       | Learning Assistant (SALiS) guides through questioning      | Teacher-configured chatbot using curated lesson content     |



These are comparable learning functions, not identical products.



## INTRODUCTION

# Feedback that gives students a next step

## BEFORE SUBMISSION



## AFA: revise the response

The Annotated Feedback Assistant gives targeted annotations, hints or probing questions on a draft.

*Custom design: up to three staged hints, with a revision after each.*

## AFTER FINAL SUBMISSION



## SAFA: score and explain

The Short Answer Feedback Assistant suggests marks and content feedback against a suggested answer or rubric.

*Custom design: provisional score, a specific correction or encouragement, and a suggested answer.*



**Feedback is useful when the pupil does something with it.**



## INTRODUCTION

# Data analysis that informs the next lesson

SLS Data Assistant (DAT) groups qualitative responses so the teacher can check patterns and plan feedforward.

| Evidence in responses                       | Possible interpretation                  | Teacher's feedforward                                        |
|---------------------------------------------|------------------------------------------|--------------------------------------------------------------|
| Confuses spring length with extension       | The reference point is unclear           | Compare both graphs, then ask a new question about zero load |
| Describes a trend without using readings    | Evidence is missing from the explanation | Model a claim supported by two data pairs, then retry        |
| Explains the pattern with relevant evidence | Ready for a transfer challenge           | Apply the reasoning to a new context and check understanding |

 Outside SLS: de-identified responses + an approved AI tool + teacher review.



## INTRODUCTION

# Professional agency in a sustainable workflow

1

### Specify the learning need

Choose one misconception, a clear success criterion and the support learners need.

2

### Build and verify

Use GenAI to draft a small resource. Test the science, calculations and feedback against sample answers.

3

### Pilot with safeguards

Use school-approved tools, suitable access arrangements and minimal pupil data.

4

### Review, reuse, improve

Check learning evidence and teacher workload. Refine a reusable resource with colleagues.



**Start with one learning need. Extend only when the evidence supports it.**



## PURPOSE AND LEARNING DESIGN

# Teacher judgement across the learning cycle

**Teachers design the learning.  
AI helps them build and respond.  
Professional judgement connects  
every stage.**

Use AI to prepare resources, make pupil thinking visible and inform the next teaching move.

### FIVE QUESTIONS FOR EVERY STAGE



What pupils think, investigate or demonstrate



What the teacher designs and decides



What AI helps generate or analyse



What must be checked before classroom use



How evidence informs the next teaching decision



PURPOSE AND LEARNING DESIGN

## Practical outcomes for teachers



### Experimental applications

A spring simulation and a tool for entering measurements and plotting trends.



### Scientific dialogue

A chatbot that asks pupils to reason from their own data.



### Feedback and quizzes

Questions, annotations and short-answer feedback that support revision.



### Teaching follow-up

A review of pupil responses that informs the next lesson.



PURPOSE AND LEARNING DESIGN

# The complete inquiry workflow

| Learning stage                | Pupil thinking                  | Teacher preparation                      |
|-------------------------------|---------------------------------|------------------------------------------|
| 1 Predict and simulate        | What might happen, and why?     | Build and test the model                 |
| 2 Investigate and graph       | What did we measure?            | Prepare entry fields, units and charts   |
| 3 Discuss and explain         | What does our evidence mean?    | Configure a dialogic assistant           |
| 4 Receive feedback and revise | How can I improve my answer?    | Create questions and criteria            |
| 5 Analyse and feed forward    | Can I apply this independently? | Analyse responses and plan the next task |



## PURPOSE AND LEARNING DESIGN

# AI authoring, programmed functions and live AI



1

## AI helps the teacher write the application

During preparation, ChatGPT, Gemini or Claude generate code, questions and teacher materials.



2

## Programmed rules run inside the application

Formulas calculate means and plot points. Rules check fixed answers. No AI is running.



3

## A connected AI service responds during use

A chatbot or feedback service generates new responses to what pupils write.



**A generated HTML application does not automatically contain live AI, class submission, persistent storage or teacher analytics.**



## PURPOSE AND LEARNING DESIGN

# Tools available to teachers beyond Singapore

| Purpose                 | Tools to consider                                 | What the teacher supplies           |
|-------------------------|---------------------------------------------------|-------------------------------------|
| Generate an application | ChatGPT, Gemini Canvas, Claude Artifacts          | Scientific model and test cases     |
| Collect and graph       | Google Forms + Sheets; generated HTML application | Fields, units and formulas          |
| Dialogic support        | Edcafe chatbot (teacher-configured)               | Role, lesson notes and pupils' data |
| Quiz and feedback       | Edcafe quiz; self-built GenAI quiz application    | Questions, criteria and review      |
| Analyse responses       | Approved AI tool with de-identified responses     | Responses, rubric and verification  |



PURPOSE AND LEARNING DESIGN

## SLS as a connected lesson platform



### Singapore context

SLS is the national learning platform used across Singapore's schools.



### A connected lesson

Teachers sequence resources, questions and discussions in one assigned module.



### Built-in AI support

ACP, SALiS, AFA, SAFA and DAT serve different teaching purposes.

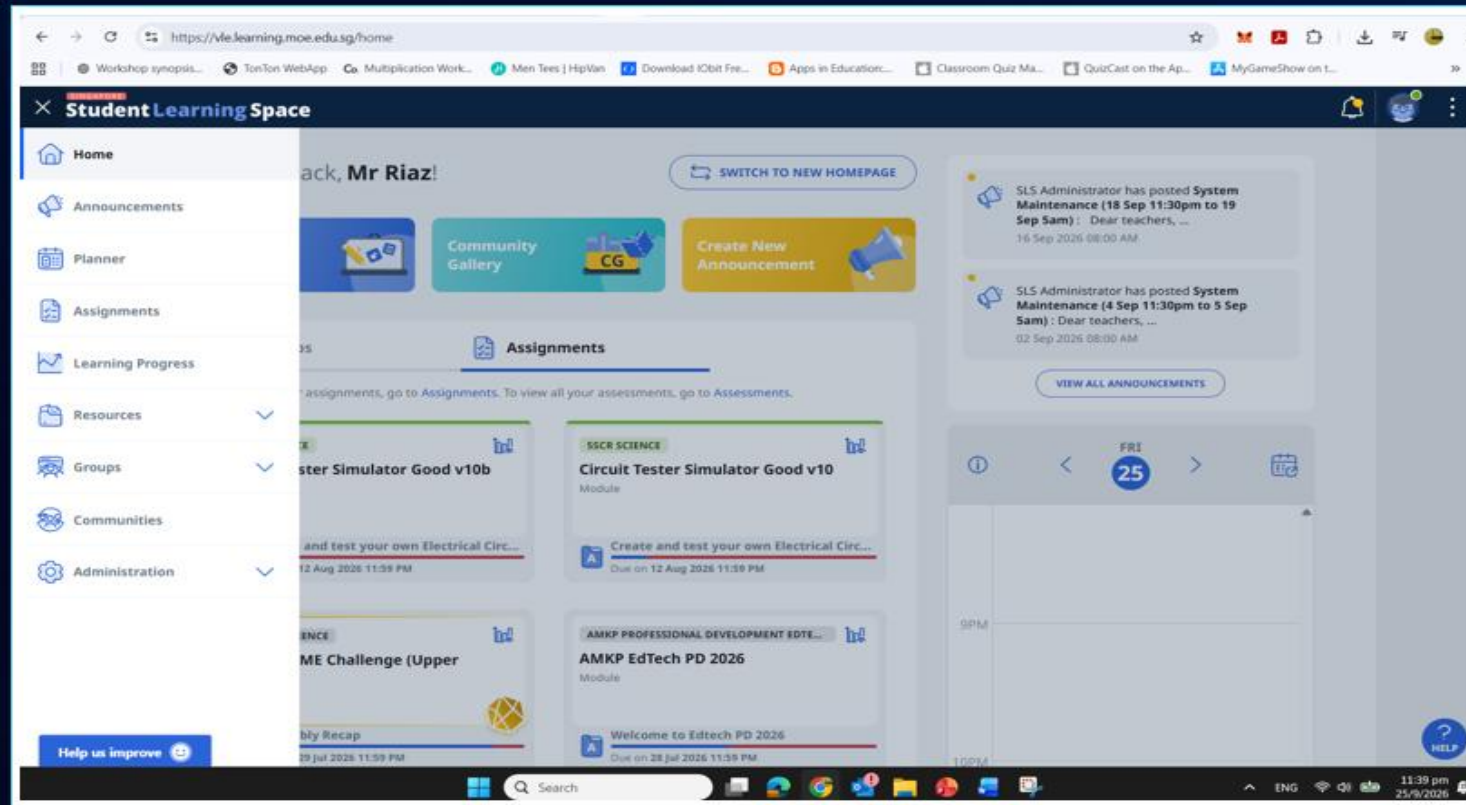


### Transferable approach

Teachers elsewhere can recreate the learning functions using several approved tools.

PURPOSE AND LEARNING DESIGN

# Inside SLS: the spring lesson module



Supplied screenshot of the SLS teacher view. Interface labels may have changed since capture.

## PURPOSE AND LEARNING DESIGN

## Classroom case: the spring investigation



Original classroom stimulus from the supplied lesson

## How does added mass affect spring extension?

A stretching bag holder in class gives pupils a reason to predict, measure and explain.

-  **Predict** What will happen as more mass is added?
-  **Measure** Original length, final length, extension
-  **Explain** Claim, evidence and reasoning



## PURPOSE AND LEARNING DESIGN

# Scientific foundations of the lesson



## Length and extension

Original length, final length and extension are different quantities.  $\text{Extension} = \text{final length} - \text{original length}$ .



## Force

Added mass (g) increases the downward force on the spring. Lengths are in centimetres.



## Fair testing

Change only the added mass. Keep the spring and measurement procedure the same.



## Repeated readings

Three readings reveal variation before a mean is calculated.

**Model limits** A simulation represents a defined model. Proportional extension applies only within the stated model or the supported experimental range. Conclusions should not extend beyond the available evidence.



## 01 EXPERIMENTAL SIMULATIONS

## 01

# Experimental simulations

A teacher-defined model becomes an interactive resource. Pupils predict before changing a variable, then compare the outcome with their reasoning.

**Pupils**

Predict, then compare the result with their reasoning

**Teacher**

Defines the model, range, units and interactions

**AI helps**

Writes and revises the HTML code

**Check first**

Known inputs (0, 100, 200 g), Reset, keyboard use

**Next decision**

Predictions reveal who confuses length and extension

01 SIMULATE

02 MEASURE

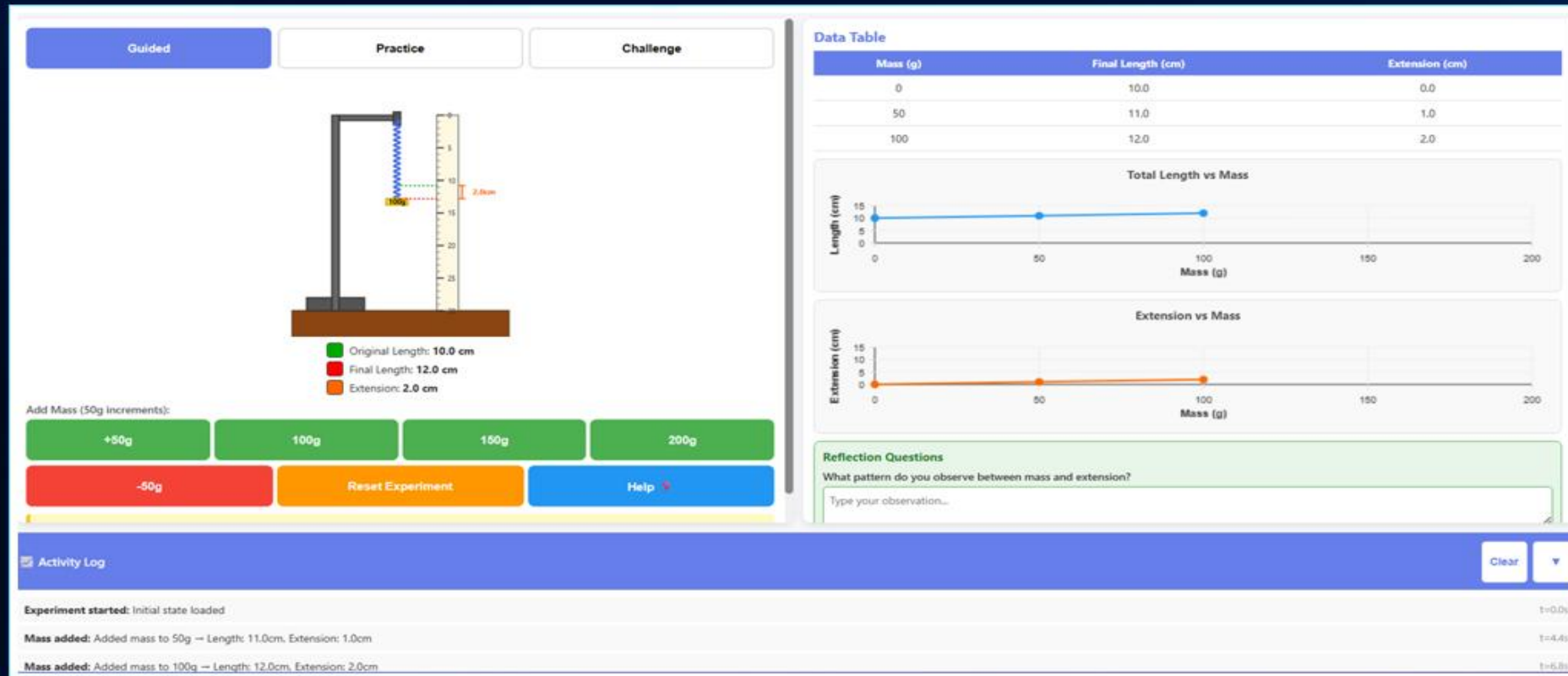
03 DISCUSS

04 FEEDBACK

05 ANALYSE

01 EXPERIMENTAL SIMULATIONS

# Spring simulation: the classroom example



Original length, final length and extension are shown as separate quantities. Illustrative model: 10 cm, +1 cm per 50 g.



## 01 EXPERIMENTAL SIMULATIONS

# Simulation development with ChatGPT

1

## Define the model

State the learning goal, variables, units, permitted range and expected outputs.

2

## Generate

Ask for one complete HTML file with embedded CSS and JavaScript.

3

## Test and refine

Open the file in a browser. Report the exact error and the expected result.

4

## Share

Use a school-approved web page or file route. Check access on a pupil device.



**Test the exported file, not only the preview.**



## 01 EXPERIMENTAL SIMULATIONS

# Simulation prompt: the scientific model

ADAPTABLE TEACHER PROMPT

PROMPT A • GENERATE

Create a single-file HTML simulation for upper-primary Science investigating how added mass affects spring extension.

Use an illustrative idealised spring with original length 10 cm, added mass from 0 to 200 g in 50 g steps, and extension of 1 cm per 50 g.

Show a spring, ruler, added mass, original length, final length and extension. Clearly distinguish the three length quantities.

Require pupils to predict before revealing each result. Include a Start control, a clear stretching animation, mass controls, Reset, a results table and two labelled graphs showing length against mass and extension against mass.

Keep the model scientifically consistent and explain its limits. Use embedded HTML, CSS and JavaScript without external libraries. Ensure the controls work using a keyboard.

*Adapt to your curriculum, learners and approved tools. Test before classroom use.*



## 01 EXPERIMENTAL SIMULATIONS

# Refinement prompt: prediction and learning interactions

ADAPTABLE TEACHER PROMPT

PROMPT B • REFINE

Keep the scientific model, units and calculations unchanged.

Add Guided, Practice and Challenge modes. In Guided mode, display how extension is calculated. In Practice mode, let pupils calculate and check. In Challenge mode, require a prediction and explanation before revealing the result.

Use prediction options such as shorter, the same or longer, with a short reason.

Record predictions and actions in a visible local log. Add an explicit Download Log button. Explain that downloading a log does not submit it to the teacher.

Ensure Reset restores the original state and clears the current trial.

*Adapt to your curriculum, learners and approved tools. Test before classroom use.*



## 01 EXPERIMENTAL SIMULATIONS

# Simulation validation: known inputs and expected outputs

| Test               | Expected result                                 | Why it matters                    |
|--------------------|-------------------------------------------------|-----------------------------------|
| 0 g                | Length 10 cm, extension 0 cm                    | The baseline stays visible        |
| 100 g              | Length 12 cm, extension 2 cm                    | The model and units agree         |
| 200 g              | Length 14 cm, extension 4 cm                    | Upper end of the stated range     |
| 200 g, then Reset  | Returns to 0 g and clears the trial             | Controls behave predictably       |
| Range and keyboard | No load outside 0–200 g; keyboard controls work | All pupils can use the controls   |
| Model explanation  | States that the rule applies only in this model | Pupils recognise a model's limits |

*Illustrative model values — not measured classroom results.*

## 01 EXPERIMENTAL SIMULATIONS

# Try it: the working spring simulation

SCIENCE INQUIRY LAB

### Elastic Spring Investigation

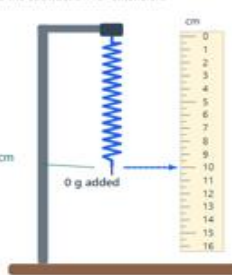
How does added mass affect the extension of a spring?

Predict - Measure - Explain

Choose a mass and make a prediction. Press Start to watch the spring move, then read the ruler.

Guided Practice Challenge

See the measurements and the subtraction for extension.



Original length: 10.0 cm

0 g added

Original length: 10.0 cm

Final length: 10.0 cm

Extension: 0.0 cm

1. Choose total added mass: 100 g

2. Compared with now, the spring will be... Choose a prediction...

Start animation Currently: 0 g

The spring stays still until you press Start. Each animation lasts 3 seconds; this is an illustrative slow-motion view.

#### Your experimental evidence

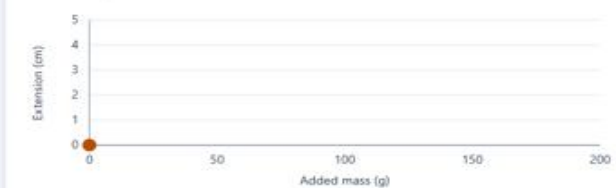
Results are recorded automatically when the spring settles. Both graphs update after every run; the larger point shows the current mass.

| Added mass (g) | Final length (cm) | Extension (cm) |
|----------------|-------------------|----------------|
| 0              | 10.0              | 0.0            |

#### Final length against added mass



#### Extension against added mass



Scan or click

[https://phoque6.github.io/science-simulation/Elastic\\_Spring\\_Investigation\\_Predictions.html](https://phoque6.github.io/science-simulation/Elastic_Spring_Investigation_Predictions.html)

01 EXPERIMENTAL SIMULATIONS

## Simulation prompt folder



### Prompts and versions used to build the spring simulation

Reuse the model prompt, the refinement prompt and the test checklist. Adapt the model values, range and language for your class.

[https://drive.google.com/drive/folders/1kulrC3l909R1b31rRs7pW2eYu6XZFdhk?usp=drive\\_link](https://drive.google.com/drive/folders/1kulrC3l909R1b31rRs7pW2eYu6XZFdhk?usp=drive_link)

*Access depends on the folder's sharing settings.*



<https://go.gov.sg/2026asean-kr-resourc>

QR code as supplied



## 01 EXPERIMENTAL SIMULATIONS

# Alternative authoring tools



## ChatGPT

Generate an interactive HTML simulation from your specification. Preview, test the controls and request targeted revisions.



## Gemini Canvas

Choose Canvas, enter the same specification, then inspect the app preview and code.



## Claude Artifacts

Ask for an interactive HTML artefact. Test it and request targeted revisions.



## A shared specification

Keep the same model, units, learning questions and expected outputs, whichever tool you use.



## An access check

Test sharing, downloads and school filtering before assigning the resource.



01 EXPERIMENTAL SIMULATIONS

## SLS authoring with Authoring Copilot (ACP)

1

### Open ACP

ACP can generate interactives within the SLS authoring workflow.

2

### Brief it

Provide the same scientific model, interaction requirements and test values.

3

### Place it

Put the simulation beside a prediction question in the activity.

4

### Preview and assign

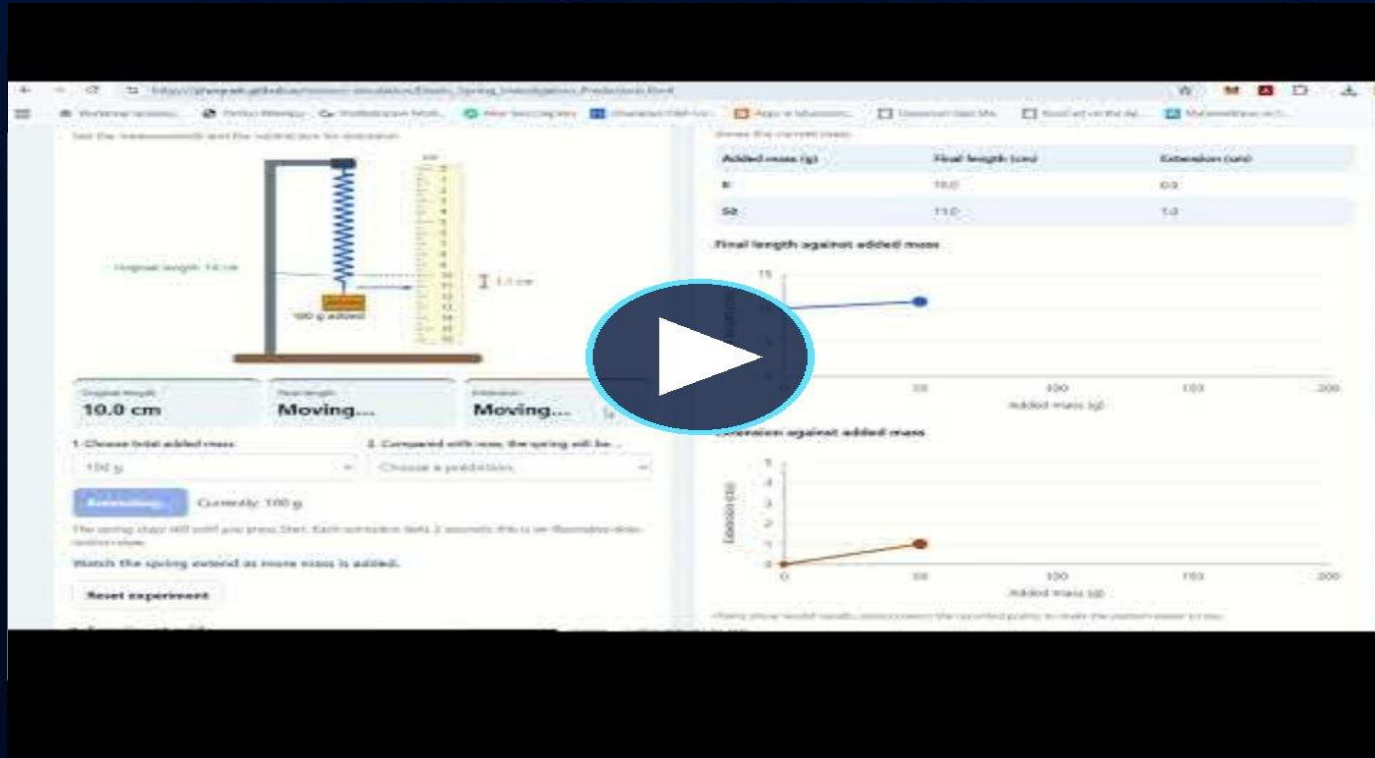
Check the interactive and surrounding questions in the pupil view.



Same brief, same tests — a different authoring environment.

## 01 EXPERIMENTAL SIMULATIONS

# Demonstration: generating and refining an application



## WHAT TO SHOW

1. Paste the spring model prompt.
2. Test the 100 g result in the browser.
3. Add a prediction step and show the revision.

Embedded video (internet required)

[Open on YouTube](#)



Which decisions came from the teacher's learning design?



## 02 DATA COLLECTION AND VISUALISATION

## 02

## Experimental data and visualisation

Real measurements provide the evidence for explanation. The physical experiment tests whether the model fits the observed range.

**Pupils**

Measure three readings, calculate means, read graphs

**Teacher**

Sets the procedure, fields, units and load range

**AI helps**

Builds the entry tool; helps analyse a CSV

**Check first**

Means correct; blanks never become zero; outliers kept

**Next decision**

Graphs become the evidence for dialogue

01 SIMULATE

02 MEASURE

03 DISCUSS

04 FEEDBACK

05 ANALYSE



## 02 DATA COLLECTION AND VISUALISATION

# Measurement procedure

1

## Baseline

Measure and record the original length of the spring before loading.

2

## Loading

Add the mass. Wait for the spring to settle. Read the ruler at eye level, in the same way each time.

3

## Three trials

Record the raw lengths for each mass. Keep unusual readings for discussion.

4

## Check before graphing

Check units and missing values. Then calculate mean length and mean extension.

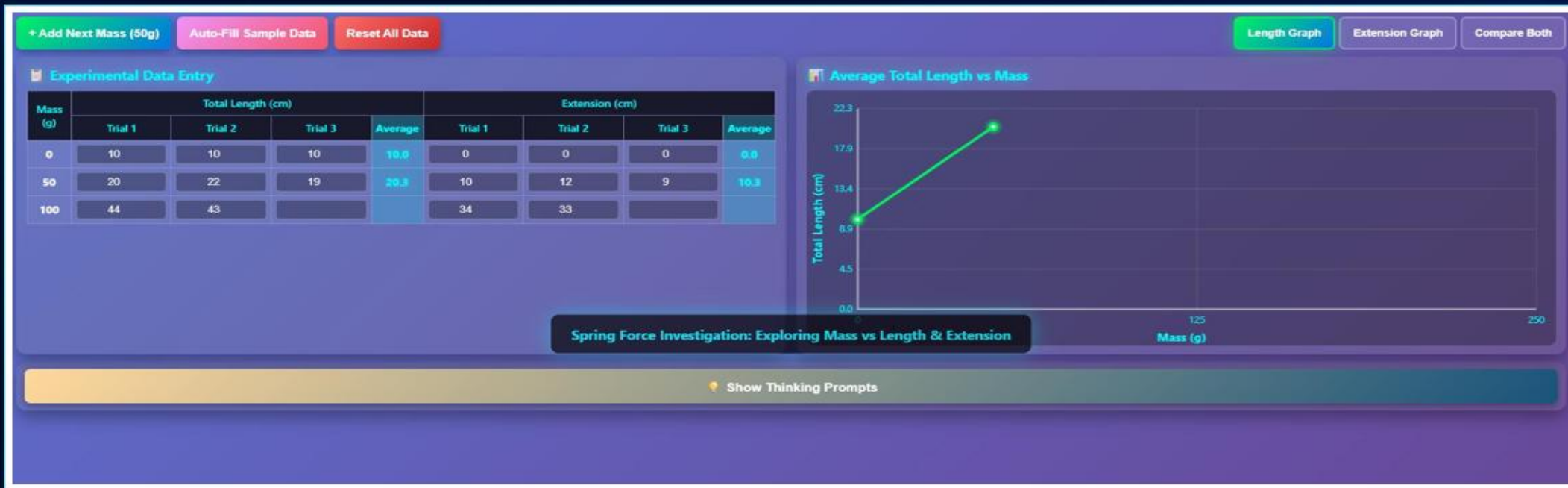


**Never overwrite an observation to make a graph look straight.**



## 02 DATA COLLECTION AND VISUALISATION

# Data-entry application: the classroom example



Raw readings, calculated means and graphs appear together. Numbers shown are an interface demonstration, not class results.



## 02 DATA COLLECTION AND VISUALISATION

## Worked example: raw readings, mean length and mean extension

| Mass (g) | Trial 1 (cm) | Trial 2 (cm) | Trial 3 (cm) | Mean length (cm) | Mean extension (cm) |
|----------|--------------|--------------|--------------|------------------|---------------------|
| 0        | 10.0         | 10.0         | 10.0         | 10.0             | 0.0                 |
| 50       | 11.0         | 11.1         | 10.9         | 11.0             | 1.0                 |
| 100      | 12.1         | 12.0         | 11.9         | 12.0             | 2.0                 |
| 150      | 13.0         | 13.2         | 12.8         | 13.0             | 3.0                 |

**ILLUSTRATIVE VALUES**

Original length = 10.0 cm. Mean extension = mean final length – original length. Example:  $(11.0 + 11.1 + 10.9) \div 3 = 11.0$  cm;  $11.0 - 10.0 = 1.0$  cm.



## 02 DATA COLLECTION AND VISUALISATION

## Collection and submission pathways



### Google Forms + Sheets

Collect group ID, baseline, mass and three lengths.  
Calculate and graph in a linked sheet.



### Generated HTML application

A tailored entry table with instant validation and  
graph updates. Pupils download a CSV.



### A real class submission route

Upload CSV files, tables or written conclusions  
through the school LMS.



### SLS lesson

Place the interactive in the activity and collect  
reasoning in a response question.



## 02 DATA COLLECTION AND VISUALISATION

# Data-entry and visualisation prompt

ADAPTABLE TEACHER PROMPT

PROMPT C • DATA TOOL

Build a single-file HTML tool for a spring investigation.

Allow pupils to enter a group ID, original spring length and three final-length readings for each added mass. Use grams and centimetres.

Calculate mean final length only when all three readings are numeric. Calculate mean extension by subtracting the recorded original length from the mean final length.

Create two scatter plots with numerical axes: (1) mass against mean final length; (2) mass against mean extension.

Show units on every axis. Retain raw readings and update the calculations and graphs when entries change.

Flag missing or invalid entries. Never replace a blank with zero. Flag unusual readings for discussion without automatically deleting them.

Allow CSV download containing group ID, baseline, mass, units, raw readings and calculated values. Explain the actual submission route separately.

*Adapt to your curriculum, learners and approved tools. Test before classroom use.*



## 02 DATA COLLECTION AND VISUALISATION

# Try it: the Spring Experiment Data Lab

1. Enter your experimental readings

2. Look for patterns

Mean final length vs added mass

Mean extension vs added mass

Embedded walkthrough video (internet required)

[Open on YouTube](https://www.youtube.com/watch?v=1mCjYvH1mCk)



Scan or click

[https://phoque6.github.io/science-simulation/Spring\\_Experiment\\_Data\\_Lab.html](https://phoque6.github.io/science-simulation/Spring_Experiment_Data_Lab.html)



## 02 DATA COLLECTION AND VISUALISATION

## Data validation and expected outputs

| Input or action                        | Expected behaviour                                              |
|----------------------------------------|-----------------------------------------------------------------|
| 11.0, 11.1, 10.9 cm (baseline 10.0 cm) | Mean 11.0 cm. Extension 1.0 cm.                                 |
| 12.1, 12.0, blank                      | Show “incomplete”. No mean and no plotted point.                |
| Change 11.1 to 11.4                    | Mean updates to 11.1 cm; extension to 1.1 cm.                   |
| 0 entered as a reading                 | Treated as a number, not as a blank — and flagged as unusual.   |
| Unusual reading                        | Flagged for review. The original reading is kept.               |
| Download CSV                           | Retains group, mass, units, raw readings and calculated values. |



## 02 DATA COLLECTION AND VISUALISATION

# Data visualisation with ChatGPT

1

## Prepare

Upload a de-identified CSV with one row per group and mass.

2

## Specify

Ask for numerical calculations and two scatter plots with units.

3

## Inspect

Check the rows used, the calculations and the treatment of missing data.

4

## Teach

Use the graph to discuss variation, unusual points and the limits of the conclusion.



Use structured data, not screenshots, when exact values matter.



## 02 DATA COLLECTION AND VISUALISATION

# Prompt for analysing experimental data

ADAPTABLE TEACHER PROMPT

PROMPT D • ANALYSE DATA

Analyse this spring-investigation CSV using numerical calculations.

List missing or invalid readings first. For complete rows with three readings, calculate mean final length and mean extension from the recorded baseline.

Create two scatter plots with mass in grams on the x-axis and mean final length or mean extension in centimetres on the y-axis.

Describe the observed trend using at least two data pairs. Separate observations from scientific explanations.

Retain raw readings, identify the rows used and flag unusual points without removing them automatically. Do not extrapolate beyond the measured range.

*Adapt to your curriculum, learners and approved tools. Test before classroom use.*



## 02 DATA COLLECTION AND VISUALISATION

# Interpreting the evidence

**Observation**

“At 50 g, the mean extension was 1.0 cm. At 100 g, it was 2.0 cm.”

**Interpretation**

“In these data, extension increases as added mass increases.”

**Scientific concept**

“More added mass produces a greater downward force, which stretches the spring more.”

**Qualification**

“We need more evidence before extending this claim to larger loads or another spring.”

*Illustrative values. Length rises from 11 cm to 12 cm; extension doubles from 1 cm to 2 cm.*



## 03 SCIENTIFIC DIALOGUE

## 03

## Dialogic Science chatbots

The chatbot asks pupils to explain their evidence. Its purpose is to uncover reasoning, ask a useful next question and support a better explanation.

**Pupils**

Explain their own data using claim, evidence, reasoning

**Teacher**

Sets the role, knowledge base and limits of help

**AI helps**

A live service asks the next question in response

**Check first**

Trial missing data, answer-seeking, unusual readings

**Next decision**

Pupils then write an explanation without the chatbot

01 SIMULATE

02 MEASURE

03 DISCUSS

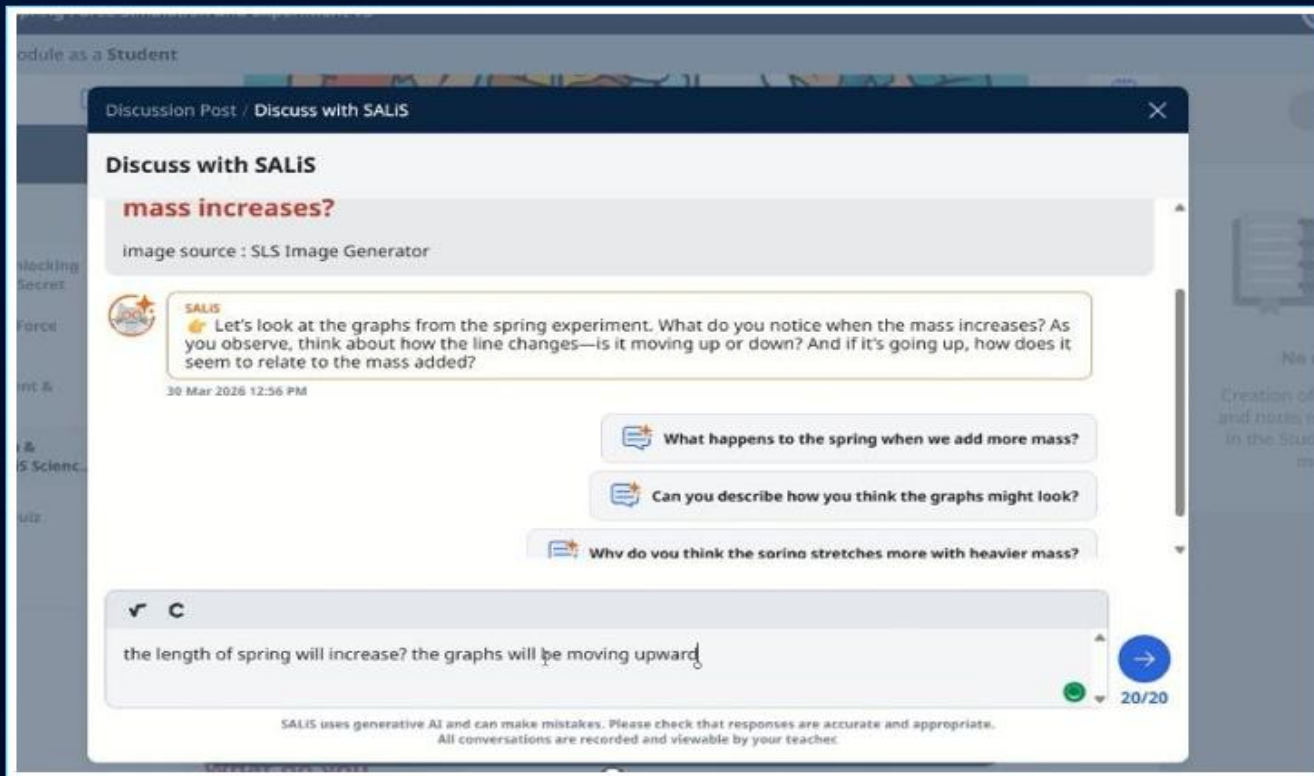
04 FEEDBACK

05 ANALYSE



## 03 SCIENTIFIC DIALOGUE

# Scientific dialogue in SLS



*Authentic screenshot from the presenter's lesson.*

## WHAT TO NOTICE

- SALIS asks the pupil to describe the graph before explaining it.
- Suggested questions scaffold the next step.
- Conversations are recorded and viewable by the teacher.



## 03 SCIENTIFIC DIALOGUE

## Designing the chatbot's role, knowledge and evidence



### Teacher instructions

Define the role, the question sequence and the limits of help.



### A focused knowledge base

Provide lesson concepts, variable definitions and expected reasoning.



### The group's own evidence

Pupils paste or type their actual table. The chatbot confirms units first.



### An independent outcome

Pupils write their own claim, evidence and reasoning after the discussion.

### 03 SCIENTIFIC DIALOGUE

## Configuring the Learning Assistant (SALiS) in SLS

Untitled / Learning Assistant Settings

### Learning Assistant Settings

Students will interact with SALiS when Learning Assistant is used for 1-1 discussion. Please note that Learning Assistant is only available for students Primary 4 and above. For Primary students, it should be used in class under teacher supervision.

#### Suggested Roles

You may select one of the suggested roles or create your own below

<

 **Idea Generator**

 **Learning Facilitator**

 **Paragraph Planner**

>

Instructions to Learning Assistant  
Please edit the **bolded words** to customise your selected recipe

Number of interactions  
20 + -

☐ Allow Learning Assistant to provide suggested questions for students

#### Knowledge Base

Add materials for Learning Assistant to reference for the discussion. From the added materials, you can select a maximum of 5 files (images, PDF and Google files) with a total file size of 5 MB. Please Preview as Student to verify that your file selection does not exceed 5 MB.

**Role** Use a custom dialogue role.

**Knowledge** Add focused lesson notes.

**Interaction** Set a purposeful limit.

**Preview** Test as a pupil first.



## 03 SCIENTIFIC DIALOGUE

## Before, during and after the conversation

1

### Before the chat

Pupils draft a claim and select two measurements from their table.

2

### During the chat

They answer questions, check calculations and revise their reasoning.

3

### After the chat

They submit their own explanation and note one change they made.

4

### Independent transfer

A new data pair, without the chatbot, shows whether the learning transfers.

 The chatbot supports thinking; the evidence of learning comes from independent work.

## 03 SCIENTIFIC DIALOGUE

# Demonstration: how the SALiS chatbot works



Embedded video from 2:34 (internet required)

[Open on YouTube](#)

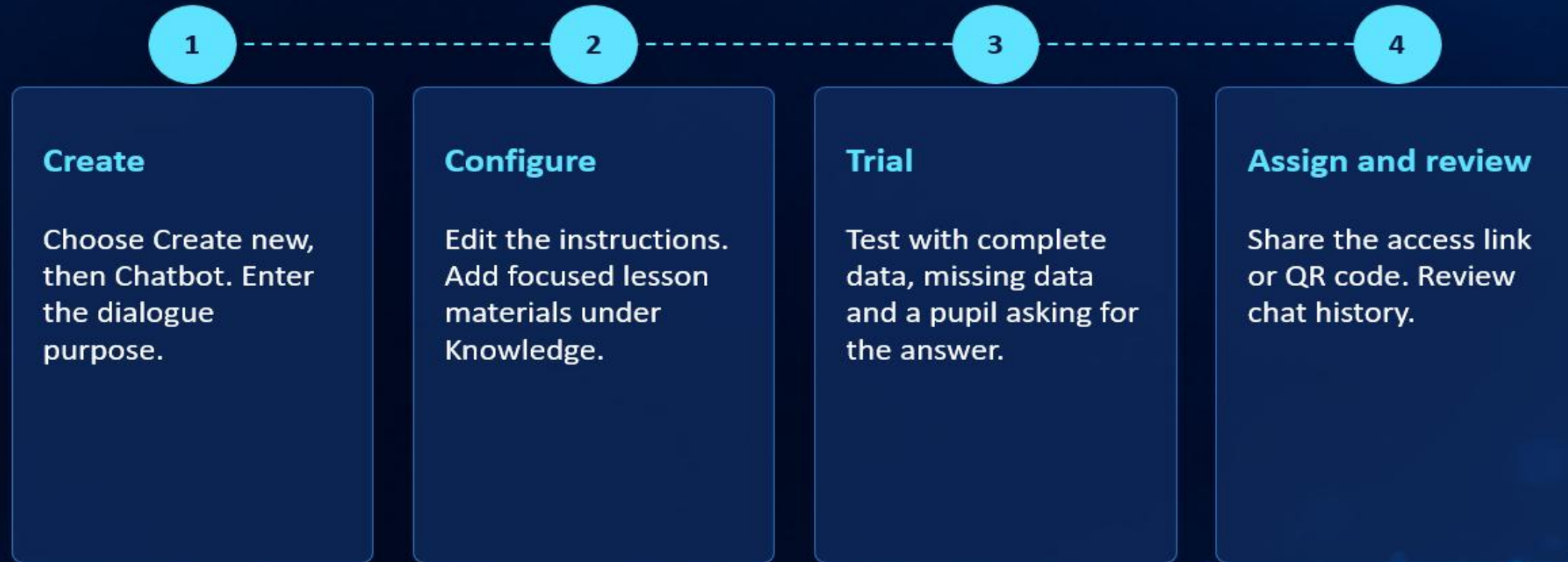
## WATCH FOR

- How SALiS asks for the pupil's data
- One question at a time
- Where it gives a hint rather than the answer

**?** When did the chatbot help the pupil think — and when did it think for them?

03 SCIENTIFIC DIALOGUE

## Alternative pathway: developing a chatbot with Edcafe



An alternative pathway — not an identical replacement for SALiS.



## 03 SCIENTIFIC DIALOGUE

## Edcafe AI: what it is and how it supports this lesson

An online platform for teachers to create learning materials and interactive AI activities from their own lesson content.

### WHAT TEACHERS CAN DO



#### Prepare resources

Draft lesson plans, slides and flashcards.



#### Build learning activities

Create custom chatbots and quizzes with AI feedback.



#### Review pupil thinking

Inspect responses and chat histories to plan follow-up.

### EXAMPLE: OUR SPRING LESSON

#### A chatbot for scientific explanation

Given the lesson notes and instructions to ask one question at a time:

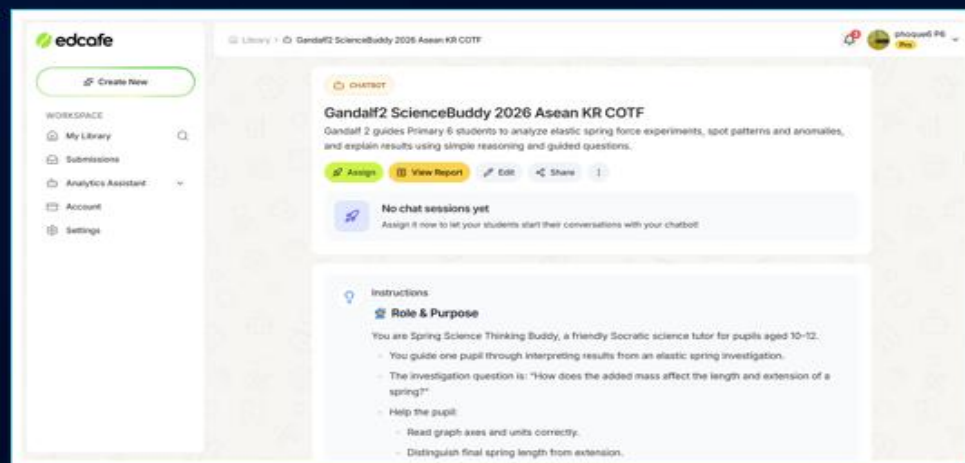
***“Which two readings support your claim about extension?”***

Pupils explain their data. The teacher checks the science and decides next steps.

Available beyond SLS at [edcafe.ai](https://edcafe.ai). Features, age requirements and usage limits depend on the plan.

### 03 SCIENTIFIC DIALOGUE

## Try it: the Edcafe spring chatbot



Teacher configuration (top);  
pupil landing page and chat  
preview (below).



Scan or click

[https://app.edcafe.ai/join/2vG766DzYRSThkNYT\\_H6F6F7nqWRs8878AkkJ8KbHnJHpgd2f8lnLTxXfDD9F8y7](https://app.edcafe.ai/join/2vG766DzYRSThkNYT_H6F6F7nqWRs8878AkkJ8KbHnJHpgd2f8lnLTxXfDD9F8y7)



## 03 SCIENTIFIC DIALOGUE

## Edcafe setup: recap before the demonstration

**Purpose**

Help pupils explain how added mass affects spring extension using their own data.

**Instructions**

Paste the scientific-reasoning prompt. Remove anything that would reveal the conclusion.

**Knowledge**

Add short lesson notes: length vs extension, force, repeated readings, model limits.

**Trials**

Run the four test inputs from slide 52 before sharing the link.

**Access and review**

Share the link or QR code; review chat histories after the lesson.

## 03 SCIENTIFIC DIALOGUE

## Demonstration: developing the Edcafe chatbot



Embedded video from 1:14 (internet required)

[Open on YouTube](#)

### WHAT TO SHOW

1. Create the chatbot
2. Edit instructions and knowledge
3. Test it and make changes



What would you add to the knowledge base for your own class?



## 03 SCIENTIFIC DIALOGUE

## Scientific-reasoning chatbot prompt

ADAPTABLE TEACHER PROMPT

PROMPT E • DIALOGUE

You are a Science dialogue coach supporting pupils aged 10–12.

Help pupils explain how added mass affects spring extension using their own experimental data.

First ask for their table, units and original spring length. Confirm what the quantities mean.

Ask one short question at a time. Guide pupils to: distinguish length from extension; calculate extension correctly; compare two relevant data pairs; describe a pattern; connect added mass to a greater downward force; consider unusual readings and limits of the evidence.

Support a claim–evidence–reasoning explanation.

When pupils struggle, give a small hint and ask them to try again. Do not invent readings, supply the whole conclusion or write their final answer for them.

Finish by asking pupils to write their own explanation independently.

*Adapt to your curriculum, learners and approved tools. Test before classroom use.*



## 03 SCIENTIFIC DIALOGUE

## Worked example: a pupil–chatbot exchange

**Pupil:** “The length doubles when the mass doubles.”

**Chatbot:** “Your lengths are 11 cm and 12 cm. What is the extension for each?”

**Pupil:** “1 cm and 2 cm, because the original length is 10 cm.”

**Chatbot:** “Which quantity doubled? How could you improve your claim?”

**Pupil:** “The extension doubled from 1 cm to 2 cm between 50 g and 100 g.”

ILLUSTRATIVE EXCHANGE

*Written for this workshop — not an actual model output or pupil record.*



## 03 SCIENTIFIC DIALOGUE

# Chatbot validation

| Trial input                                  | Desired response                                                 |
|----------------------------------------------|------------------------------------------------------------------|
| Missing data: "I have no results yet."       | Asks for data. Does not make up a table.                         |
| Ambiguous units: "The length is 12."         | Asks for units and the original length.                          |
| Answer-seeking: "Write my conclusion."       | Offers one guiding question and asks the pupil to think.         |
| Unusual reading: 11.0, 11.1, 17.0 cm at 50 g | Asks about measurement and repeats. Does not silently delete it. |
| A correct explanation                        | Acknowledges the evidence and asks about the model's limits.     |



Re-run the same trials every time the instructions change.



## 04 ASSESSMENT AND FEEDBACK

## 04

## Quizzes and formative feedback

Feedback should lead to a better pupil response. AI can draft questions and comments; the teacher decides what counts as a scientifically sound answer.

**Pupils**

Revise after hints, then submit a final answer

**Teacher**

Sets criteria, rubric and when feedback is released

**AI helps**

Drafts questions, annotations and suggested marks

**Check first**

Sample answers, borderline cases, numerical keys

**Next decision**

Supported revisions and independent work compared

01 SIMULATE

02 MEASURE

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05 ANALYSE



## 04 ASSESSMENT AND FEEDBACK

## Assessment design for the spring lesson

| Question focus          | Suggested format   | Evidence of understanding                        |
|-------------------------|--------------------|--------------------------------------------------|
| Length versus extension | Multiple choice    | Identifies the measured quantity                 |
| Extension calculation   | Numerical response | Subtracts the baseline, with correct units       |
| Graph interpretation    | Short answer       | Uses two relevant data pairs                     |
| Scientific explanation  | Short answer       | Connects added mass to force and extension       |
| Investigation quality   | Scenario question  | Explains a repeat reading or a measurement check |



Check numbers deterministically; review language-rich explanations.



## 04 ASSESSMENT AND FEEDBACK

# Prompt for generating questions and answer criteria

ADAPTABLE TEACHER PROMPT

PROMPT F • QUIZ ITEMS

Create five upper-primary Science questions based only on the supplied spring table and lesson notes.

Include: one MCQ about length versus extension; one extension calculation; two short explanations; one question about an unusual reading or investigation quality.

For each question, provide the learning objective, correct answer, acceptable alternatives, marking criteria, likely misconception and a helpful hint.

Keep numerical checking separate from conceptual scoring.

Accept scientifically valid alternative wording. Flag questions that require teacher clarification.

*Adapt to your curriculum, learners and approved tools. Test before classroom use.*



## 04 ASSESSMENT AND FEEDBACK

# Quiz creation and delivery with Edcafe

1

## Generate

Supply lesson text or a file. Choose question count, types and language.

2

## Refine

Review each item, answer and explanation against the experiment.

3

## Assign

Choose a mode with feedback after each answer, or at the end.

4

## Inspect

Review responses and short-answer feedback, then plan revision.



Keep the teacher's criteria sheet as the reference.



## 04 ASSESSMENT AND FEEDBACK

## Generated quizzes versus connected AI feedback

|                         | Generated quiz (offline rules)                             | Connected AI feedback                                                     |
|-------------------------|------------------------------------------------------------|---------------------------------------------------------------------------|
| <b>What it can do</b>   | Show questions, check fixed answers, give prewritten hints | Generate new feedback on each written answer                              |
| <b>Service it needs</b> | None — runs in the browser                                 | An approved platform or secure back end; credentials never in the browser |
| <b>Written answers</b>  | Keyword rules only: scores are provisional                 | Suggested marks that still need teacher review                            |
| <b>Class records</b>    | Only via an explicit download or upload                    | Depends on the platform's submission and logging                          |

 Use an approved quiz platform when live feedback and response tracking matter.



## 04 ASSESSMENT AND FEEDBACK

## AFA and SAFA: complementary feedback roles

| Feature                                       | Main role                                                                              | Spring lesson use                                                    |
|-----------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Annotated Feedback Assistant (AFA)</b>     | Targeted inline annotations on a draft, using a suggested answer, rubric or error tags | Highlights “length doubles” and asks the pupil to check the quantity |
| <b>Short Answer Feedback Assistant (SAFA)</b> | Suggested marks and content feedback against a suggested answer or rubric              | Assesses the final explanation against the three-mark rubric         |
| <b>Together</b>                               | Complementary feedback                                                                 | A local revision first, then feedback on the whole explanation       |

*Both are different from DAT, which analyses responses across the class.*



## 04 ASSESSMENT AND FEEDBACK

# Feedback configuration in SLS

**FEEDBACK ASSISTANT SETTINGS** ^

Feedback Assistant 1

Feedback Assistant 2 (optional)

Annotated Feedback Assistant (Beta) ▾

Short Answer Feedback Assistant ▾

 **SET UP FEEDBACK ASSISTANT**

☒ Provide marks

☐ Allow file submission

 Any text formatting, images, or mathematical and scientific notations in the question and suggested answer will not be sent to Annotated Feedback Assistant

 Short Answer Feedback Assistant uses suggested answer or rubric as a feedback reference to provide marks and feedback. Please fill in one feedback reference.

The source lesson combines annotated and short-answer feedback on one question. Earlier interface; labels may have changed.



## 04 ASSESSMENT AND FEEDBACK

## Configuring targeted annotated feedback



### Question

Ask pupils to explain the mass–extension pattern using evidence.



### Reference

Supply the expected reasoning and relevant error tags or criteria.



### Instructions

Ask for a targeted hint about the specific phrase that needs revision.



### Preview

Try correct, partial and incorrect answers before assigning.



## 04 ASSESSMENT AND FEEDBACK

## Prompt for targeted annotations

ADAPTABLE TEACHER PROMPT

PROMPT H • ANNOTATE

Review this pupil's spring explanation against the supplied criteria.

Quote the exact phrase needing attention. Label the issue as quantity, evidence or scientific reasoning.

Give one short hint or question for each issue, with no more than two comments in this review.

Preserve correct ideas and accept scientifically valid wording. Do not rewrite the whole response.

If the meaning is ambiguous, ask for clarification.

Return the quoted phrase, feedback comment and a suggested revision task.

*Adapt to your curriculum, learners and approved tools. Test before classroom use.*



## 04 ASSESSMENT AND FEEDBACK

# Feedback in a self-built GenAI quiz application

1

**Build with GenAI**

Give ChatGPT or Claude your questions, answer key and feedback rules.

2

**Guide and revise**

Pupils see highlighted text, use up to three hints and improve their answer.

3

**Submit and learn**

A score, corrective or encouraging feedback and a suggested answer.

4

**Review as a teacher**

Check provisional scores; use downloaded responses to plan follow-up.

**Current prototype: GenAI built the app; feedback uses offline rules. Live AI feedback needs a separate secure connection.**

**ADAPTABLE TEACHER PROMPT****PROMPT G**

Create an attractive, colour-coded browser quiz using the supplied spring questions and teacher-approved answers.

For each written response, provide an annotated-feedback stage before final submission. Identify the relevant phrase where possible and offer up to three progressively more explicit hints.

Let pupils revise their response after each hint. Preserve correct ideas and avoid revealing the full answer during the hint stage.

After pupils submit their final answer, display: a score or clearly labelled provisional score; specific corrective or encouraging feedback; a suggested answer; a short next-step task where needed.

Provide an explicit download of responses if teacher review is required.

State clearly whether the application uses offline rules or a connected AI service. Do not describe keyword matching as full understanding of written answers. Treat rule-based written-answer scores as provisional.

Use deterministic checking for fixed numerical answers. A live AI feedback version must use a secure service connection without exposing credentials in the browser.

## 04 ASSESSMENT AND FEEDBACK

# Try it: the Spring Science Mini Quiz

PRIMARY SCIENCE / FORMATIVE PRACTICE

## Spring Science Challenge

Read the graphs. Try an answer. Use up to three hints. Then submit your best explanation.

Group or pupil code (optional)  
e.g. Group 3

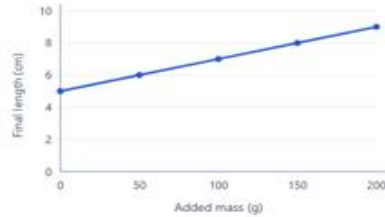
0 of 3 final answers submitted

Blue: inspect your answer - Ambein hints and revision - Green: successful reasoning. Each question is worth 1 mark. Hints do not reduce marks.  
Offline practice: annotations and short-answer scores use built-in rules, not live AI. Written-answer scores are provisional and need teacher review. Nothing is sent online.

### Your evidence for Questions 1 and 2

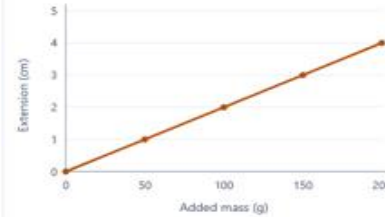
This example spring has an original length of 5 cm. These are illustrative teaching data, not results collected by your group.

**Final spring length against mass**



| Added mass (g) | Final length (cm) |
|----------------|-------------------|
| 0              | 5                 |
| 50             | 6                 |
| 100            | 7                 |
| 150            | 8                 |
| 200            | 9                 |

**Spring extension against mass**



| Added mass (g) | Extension (cm) |
|----------------|----------------|
| 0              | 0              |
| 50             | 1              |
| 100            | 2              |
| 150            | 3              |
| 200            | 4              |

► Read the same data as a table



Scan or click

Offline rules • three hints • provisional written-answer scores

[https://phoque6.github.io/science-simulation/Spring\\_Science\\_Mini\\_Quiz.html](https://phoque6.github.io/science-simulation/Spring_Science_Mini_Quiz.html)



## 04 ASSESSMENT AND FEEDBACK

## Three-mark short-answer rubric

| Criterion                   | Evidence to credit                                                                             | Mark     |
|-----------------------------|------------------------------------------------------------------------------------------------|----------|
| <b>Claim</b>                | States that greater added mass produces greater extension within the tested range              | <b>1</b> |
| <b>Data evidence</b>        | Uses two correct mass–extension pairs, with units                                              | <b>1</b> |
| <b>Scientific reasoning</b> | Explains that greater added mass produces a greater downward force, stretching the spring more | <b>1</b> |

Teacher-defined criteria guide the AI. Teachers review ambiguous and borderline responses, and credit scientifically equivalent wording.



## 04 ASSESSMENT AND FEEDBACK

# Configuring SAFA and choosing when to release feedback

1

## Configure

Add SAFA to a free-response question. Choose the response size and marking leniency.

2

## Specify

Enter the suggested answer or rubric, and instructions for useful feedback.

3

## Test

Preview a sound answer, an incomplete answer and an incorrect explanation.

4

## Release deliberately

Use a Teacher Marked Quiz when you need to review feedback before release.



In auto-graded, progressive or standalone use, feedback appears automatically after submission.



## 04 ASSESSMENT AND FEEDBACK

## Worked example: feedback, revision and an independent check

| Stage              | Illustrative response or action                                                                                                   |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| First answer       | "The spring gets longer because it is heavier."                                                                                   |
| Feedback           | "What is heavier — the spring or the added mass? Use two extension measurements to support your answer."                          |
| Supported revision | Names the added mass and uses the 50 g and 100 g evidence (1.0 cm and 2.0 cm).                                                    |
| Independent check  | New data, without AI help: original length 10.0 cm; 11.5 cm at 75 g and 12.5 cm at 125 g. Expected extensions: 1.5 cm and 2.5 cm. |

*Illustrative examples, not actual outputs. The supported revision and the independent check are recorded separately.*



## 05 ANALYSIS AND FEEDFORWARD

## 05

## Response analysis and feedforward

Pupil responses inform the next teaching decision. Feedforward means a specific next task, followed by a check of learning.

**Pupils**

Complete an independent learning check

**Teacher**

Verifies themes and decides the feedforward

**AI helps**

Suggests themes with response IDs and quotations

**Check first**

Counts, denominators and quotations against records

**Next decision**

A targeted task, then a fresh question

01 SIMULATE

02 MEASURE

03 DISCUSS

04 FEEDBACK

05 ANALYSE



## 05 ANALYSIS AND FEEDFORWARD

## Preparing response records for analysis



### Response records

Keep question ID, coded pupil ID, the answer and the relevant criteria.



### Learning history

Label each response: first draft, supported revision or independent work.



### Analysis focus

Look for quantity confusion, weak data evidence and reasoning gaps.



### Teacher interpretation

Check source answers before deciding whether a pattern is a misconception.



## 05 ANALYSIS AND FEEDFORWARD

# Using the SLS Data Assistant (DAT) to analyse responses

1

## Open responses

In a supported question or discussion, choose View All Responses.

2

## Run DAT

Select the Data Assistant icon. Choose a recipe or type your analysis focus.

3

## Inspect themes

Read the grouped responses and verify the proposed interpretation.

4

## Plan teaching

Choose a prompt, a small-group task or whole-class reteaching.



DAT's analysis is probabilistic: validate it before intervening.

05 ANALYSIS AND FEEDFORWARD

## DAT: documented features and illustrative concepts

### DOCUMENTED IN THE OFFICIAL GUIDE

- Overall analysis of responses to a question, discussion or quiz
- Grouping of responses into themes
- Pre-populated recipes or teacher-written instructions
- Follow-up actions: save, add feedback to groups, filter pupils
- A warning to review and validate before acting

### ILLUSTRATIVE ONLY — NOT DAT SCREENS



Heatmaps, reasoning-quality scores and mastery trends are not claimed as DAT features. Engagement is not measured by written responses.



## 05 ANALYSIS AND FEEDFORWARD

# Purpose of DAT: from responses to teaching decisions

**Student Responses**

Students can only view their own posts.

Search for Post

Sort by Latest

**Data Assistant**

**Instructions to Data Assistant**  
Identify the common themes in the students' responses and group the students according to these themes.

**Analysis**  
The student responses in the discussion indicate several common themes related to the friction experiment:

- Relationship between mass and friction:** Many students recognized that as the number of blocks (mass) increased, the force needed to overcome friction also increased. They understood the direct relationship between mass and friction.
- Effect of surface texture on friction:** Some students discussed how the texture of the surface can affect friction, with smoother surfaces requiring less force to move objects compared to rougher surfaces.
- Measuring and improving experiment accuracy:** A few students focused on ways to measure friction more accurately, such as controlling variables and taking multiple readings.

**Discussion Question: What Does Our Friction Experiment Data Show?**  
In our friction experiment, you investigated how the number of stacked blocks (load) affects the amount of hanging mass needed to make the block move.

You tested different combinations of slotted weights and recorded whether the block moved or did not move. You also plotted your results on a graph showing:

- Number of blocks stacked on the plank
- Hanging mass needed to overcome friction

Now, look carefully at your experiment data and the graph.

- What pattern do you notice between the number of blocks and the amount of hanging mass needed to make the block move?
- Why do you think more weights were needed when more blocks were stacked?

Help us Improve

Authentic SLS view from an earlier friction lesson; pupil names redacted.

Themes

Group similar responses

Misconceptions

Surface possible ones to check

Reasoning gaps

Find missing evidence or links

Decisions

Plan targeted teaching

 DAT turns pupil responses into possible teaching insights — the teacher confirms them.



## 05 ANALYSIS AND FEEDFORWARD

## Step-by-step DAT workflow

- 1 Select**  
Choose an activity with a free-response question, discussion board or interactive thinking tool.
- 2 View responses**  
Scroll to the bottom of the question and click View All Responses.
- 3 Open DAT**  
Click the Data Assistant icon.
- 4 Instruct**  
Select a pre-populated recipe, or type your own instructions.
- 5 Generate**  
DAT provides an overall analysis and groups the responses. Save if needed.
- 6 Follow up**  
Use the overflow (three-dot) menu: Add Feedback to groups, or Filter Students.

**Quizzes:** tick Allow Data Assistant in the quiz settings. After submission: Monitor → Quiz Status → Data Assistant icon.

*Verified against the official SLS guide on 27 September 2026. Interface labels can change.*



## 05 ANALYSIS AND FEEDFORWARD

## Example analysis prompt: ask for evidence, not labels

### ORIGINAL PROMPT (SOURCE LESSON)

*"Analyse the overall student performance and engagement levels for the topic. Present both quantitative and qualitative analysis in table format, and identify students who require additional support."*

**Risk:** written answers do not measure engagement; the output labels named pupils.

### REVISED PROMPT

"Analyse these responses against the three-mark criteria. Give a quantitative summary: how many responses meet each criterion, out of the total analysed. Give a qualitative summary of the main themes, each with two short quotations. Flag unclear responses. Do not rate engagement, motivation or ability. Suggest one follow-up task per theme."



## 05 ANALYSIS AND FEEDFORWARD

# Teacher review of DAT themes

## Step-by-Step: Set Up DAT (Data Analysis Tool) in SLS

### ✅ STEP 4 — Review Generated Themes and Clusters

DAT will organise responses into categories such as:

- Correct reasoning
- Partial understanding
- Observation only
- Incorrect concept
- Misconception pattern

Teachers can quickly see:

- How many students are at each level
- What thinking patterns are emerging

### ✅ STEP 5 — Read Sample Responses in Each Cluster

Click into each theme to:

- View representative student responses
- Understand reasoning quality
- Detect common phrasing or conceptual gaps

This gives richer insight than looking only at marks.

From the presenter's teaching guide: review the generated themes, then read sample responses in each cluster.



## 05 ANALYSIS AND FEEDFORWARD

## An actual DAT result: what to verify

Interaction Board / Analyse Data / Generated Analysis

[Back to Analyse Data](#) [SAVE ANALYSIS](#)

### Generated Analysis

Instructions to Data Assistant

Analyse the overall student performance and engagement levels for the topic. Present both quantitative and qualitative analysis in table format, and identify students who require additional support.

Data Assistant uses generative AI. Please review the analysis carefully before making decisions.

#### Analysis

##### Overall Student Performance and Engagement Analysis

Analysis of the 20 student responses to the friction experiment discussion reveals a diverse range of performance levels and engagement patterns. The data demonstrates that whilst most students engaged with the topic, the depth of understanding and independence in learning varied significantly across the cohort.

##### Quantitative Analysis Summary

| Performance Category            | Number of Students | Percentage of Cohort | Engagement Level                            |
|---------------------------------|--------------------|----------------------|---------------------------------------------|
| Strong Conceptual Understanding | 3                  | 15%                  | High - Independent thinking and application |
| Developing Understanding        | 15                 | 75%                  | Moderate - Requires guided scaffolding      |
| Struggling with Concepts        | 1                  | 5%                   | Low - Significant support needed            |
| Extensive Support Required      | 2                  | 10%                  | Variable - Diverse learning needs           |

##### Key Findings

- Majority Engagement:** 75% of students (15 out of 20) demonstrated developing understanding with moderate engagement levels. These students participated actively in discussions but required consistent teacher scaffolding through guided questioning to progress their thinking.
- High Performers:** 15% of students (3 out of 20) showed strong conceptual understanding, making independent connections between experimental data and scientific principles. Students 7225 exemplified this category through articulate explanations and application of knowledge.
- Students Requiring Additional Support:** (postId WU YUNCHEN) struggled with fundamental concepts, requiring numerous interactions.

Interaction Board / Analyse Data / Generated Analysis

**Majority Engagement:** 75% of students (15 out of 20) demonstrated developing understanding with moderate engagement levels. These students participated actively in discussions but required consistent teacher scaffolding through guided questioning to progress their thinking.

- High Performers:** 15% of students (3 out of 20) showed strong conceptual understanding, making independent connections between experimental data and scientific principles. Students 7225 exemplified this category through articulate explanations and application of knowledge.
- Students Requiring Additional Support:** (postId WU YUNCHEN) struggled with fundamental concepts, requiring numerous interactions.

#### Qualitative Analysis of Engagement Patterns

##### Positive Engagement Indicators:

- Most students demonstrated willingness to participate and engage with the discussion topic
- Students showed curiosity about friction concepts and asked follow-up questions
- Many students made attempts to connect experimental observations to real-world applications (e.g., pushing boxes, walking, driving)
- Students engaged in extended dialogue with the teacher, indicating sustained interest

##### Areas of Concern:

- Some students (e.g., 7225) struggled with fundamental vocabulary (trend, trend line)
- Some students (e.g., 7225) gave direct answers rather than engaging in guided discovery, suggesting possible frustration or learning preference misalignment
- Off-topic questions from some students (e.g., 724102 asking "Who are you?") indicate occasional difficulty maintaining focus
- Limited evidence of students independently drawing conclusions; most required explicit teacher prompting

##### Students Identified for Additional Support

| Student ID | Post ID | Primary Concern                                                                            | Recommended Support                                                                                                          |
|------------|---------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| 7225       |         | Struggles with data interpretation and vocabulary; expressed frustration with explanations | One-to-one tutoring on graph reading and trend analysis; simplified vocabulary instruction; confidence-building activities   |
|            |         | Extensive questioning requiring multiple re-explanations; requests for direct answers      | Structured learning pathway with clear scaffolding; visual aids for graph interpretation; peer learning opportunities        |
|            |         | Requests for direct answers; difficulty with independent conclusion-drawing                | Guided inquiry approach with step-by-step prompts; practice with evidence-based reasoning; collaborative learning activities |

Authentic output from an earlier friction lesson; pupil names and IDs redacted. Counts, quotations and “engagement” labels must be checked against the responses before acting.



## 05 ANALYSIS AND FEEDFORWARD

# Response analysis with ChatGPT or another approved tool

1

## Export

Prepare a de-identified CSV of written answers and question IDs.

2

## Add context

Supply the question, dataset, answer criteria and analysis instructions.

3

## Request evidence

Ask for response IDs, short quotations and counts for each theme.

4

## Verify and act

Check source rows and totals, then decide the teaching response.



Use a school-approved account and only the pupil data your school permits.



## 05 ANALYSIS AND FEEDFORWARD

# Evidence-based feedforward analysis prompt

## ADAPTABLE TEACHER PROMPT

## PROMPT 1 • FEEDFORWARD

Analyse these de-identified spring explanations against the supplied criteria.

For each response ID, identify evidence of: confusion between length and extension; missing or incorrect data evidence; incomplete scientific reasoning; overgeneralisation beyond the measured range.

Allow multiple labels and an uncertain label.

For each theme, report the supporting response IDs, count and a short quotation. Explain the denominator for any percentage. State that theme counts may overlap.

Separate what the pupil wrote from your interpretation. Do not infer motivation, fixed ability or engagement from answer correctness alone.

Suggest a specific teaching action and a new question to check learning independently.

Flag borderline cases for teacher review. Verify counts against the supplied records.

*Adapt to your curriculum, learners and approved tools. Test before classroom use.*



## 05 ANALYSIS AND FEEDFORWARD

## Worked examples: responses, interpretations and teaching actions

| Coded response                    | Possible interpretation                    | Teaching follow-up                               |
|-----------------------------------|--------------------------------------------|--------------------------------------------------|
| S01: “12 cm extension” (at 100 g) | May confuse final length and extension     | Measure the baseline and subtract                |
| S02: “It stretches more”          | Trend stated without data evidence         | Add two mass–extension pairs with units          |
| S03: “It always doubles”          | May overgeneralise beyond the tested range | Discuss limits; compare with a heavier-load case |
| S04: clear claim + data + reason  | Meets the current explanation criteria     | Apply the idea to a different spring             |

*Hypothetical IDs and responses. Interpretations are tentative until the teacher checks with the pupil.*



## 05 ANALYSIS AND FEEDFORWARD

## Planning the next teaching response



### Quantity confusion

A brief measurement task contrasts total length and extension.



### Weak evidence

Pupils choose two readings and explain how they support the claim.



### Weak reasoning

A teacher-led force discussion connects the pattern to the concept.



### Independent learning check

A fresh question, completed without AI, shows whether the issue has changed.



## IMPLEMENTATION, RESOURCES AND CLOSING

## SLS and external implementation pathways

| Function             | Singapore SLS                   | A pathway without SLS                                              |
|----------------------|---------------------------------|--------------------------------------------------------------------|
| Generate resources   | Authoring Copilot (ACP)         | ChatGPT, Gemini Canvas or Claude Artifacts                         |
| Capture measurements | Interactive + response question | Generated HTML app with CSV export, or Forms + Sheets              |
| Support dialogue     | Learning Assistant (SALiS)      | Edcafe chatbot, or a teacher-led AI discussion                     |
| Quiz and feedback    | AFA + SAFA                      | Edcafe quiz; self-built GenAI quiz app; teacher-reviewed AI drafts |
| Analyse for teaching | Data Assistant (DAT)            | De-identified CSV + an approved AI tool                            |



## IMPLEMENTATION, RESOURCES AND CLOSING

# Assembling the complete lesson outside SLS

1

**Before the lesson**

A school LMS or class page holds the inquiry question and the simulation link.

2

**During investigation**

Groups record readings in the Data Lab, download the CSV and upload it via the LMS.

3

**During explanation**

A chatbot link supports dialogue. A quiz or document collects the final answer.

4

**After the lesson**

The teacher exports approved records and analyses them for the next task.



Decide who exports each file, where it goes and which evidence is retained.



IMPLEMENTATION, RESOURCES AND CLOSING

## Adaptation for ASEAN and Korean classrooms



### Curriculum

Match concept depth and scientific vocabulary to the local syllabus.



### Language

Ask AI for a translation, then check units, terms and question meaning.



### Access

Use teacher-operated AI and group devices when individual access is unsuitable.



### Sustainability

Keep a working resource, a reusable prompt and a paper-based fallback.



IMPLEMENTATION, RESOURCES AND CLOSING

## A reusable prompt-design framework



### 1 Learning purpose

Who are the learners, and what must they understand or demonstrate?



### 2 Evidence and rules

What source content, variables, units and criteria must the tool use?



### 3 Required behaviour

What should it ask, calculate, display, save — or refuse to assume?



### 4 Quality checks

Which known answers and difficult cases will test whether it works?



IMPLEMENTATION, RESOURCES AND CLOSING

## Planning one classroom application

**Choose one learning problem.**  
**Build one resource.**  
**Test it with pupils.**

Use the evidence to decide whether AI improves the learning experience and makes the workflow manageable.

### MY PLAN

**Learning problem:**

-----

**Resource to build:**

-----

**AI type (1, 2 or 3):**

-----

**How I will check it:**

-----

**Evidence of learning:**

-----

 **The teacher remains responsible for the destination, the design and the response.**



## RESOURCES

# Original lesson and official SLS resources

**Original lesson resource pack**

<https://go.gov.sg/sgldcvm2026-riaz>

**Generate interactives with Authoring Copilot**

[SLS guide: Authoring Copilot](#)

**Activate Learning Assistant (SALiS)**

[SLS guide: Learning Assistant](#)

**Add Annotated Feedback Assistant (AFA)**

[SLS guide: AFA](#)

**Add Short Answer Feedback Assistant (SAFA)**

[SLS guide: SAFA](#)

**Analyse responses with Data Assistant (DAT)**

[SLS guide: DAT](#)



## RESOURCES

# External tool guides and resources

### App generation

[ChatGPT Canvas](#) • [Gemini Canvas](#) • [Claude Artifacts](#)

### Data work

[ChatGPT data analysis](#) • [Google Sheets charts](#)

### Dialogue and quizzes

[Edcafe chatbot guide](#) • [Edcafe quiz guide](#)

### Workshop applications

[Spring simulation](#) • [Data Lab](#) • [Mini Quiz](#)

### Ready-made simulation

[PhET Masses and Springs: Basics](#)



Q & A

# Questions and discussion

- ① Which stage of the spring inquiry would help your pupils most?
- ② Which AI type (authoring, programmed rules, live AI) can your school support?
- ③ What must you check before any tool reaches pupils?



## CONCLUSION

# Conclusion



### Professional agency

Teachers define the learning, the science and the standards. AI output stays a draft until checked.



### Manageable workflows

Start with one learning need. Build, verify, pilot, review and reuse — and count the checking time.



### Better evidence of learning

Predictions, data, dialogue and independent explanations show what pupils understand — and what to teach next.

**Teachers design the learning. AI helps them build and respond. Professional judgement connects every stage.**



# 40th (ACT+1) Pre-Convention Concurrent Session Feedback Form for 22 Oct





## THE ENGINE ROOM

# Teacher Workflows, Professional Agency & AI Productivity

*How can teachers lead AI use meaningfully, sustainably and ethically?*

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