Supporting Self-Regulated Learning in Practical Lessons

Key Elements of Lesson Design

Self-paced

- on-demand video demonstration
- recommended time

Self-help

- bite-sized instructions
- visual instructions
- tooltips

Self-monitor

- suggested answer / expected outcome
- self-assessment

develop self-regulation
among students of varied readiness

How to use the SLS modules?

Pre-lesson

To familiarise students with the practical tasks prior to the lesson

During lesson

To promote students' autonomy during the practical lesson

Post-Lesson

To revisit practical tasks with visual information for revision

Subjects:

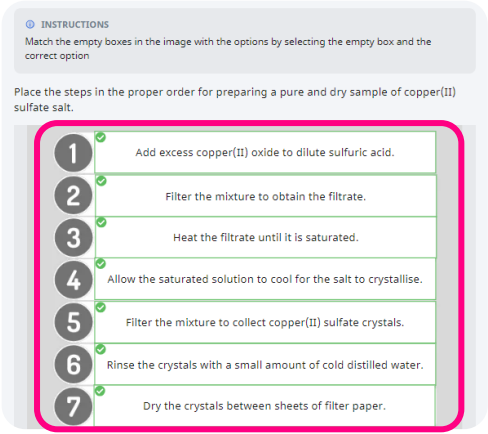
(Upper Secondary) Biology, Chemistry, Physics, Nutrition and Food Science

(Lower Secondary) Food and Consumer Education, Science

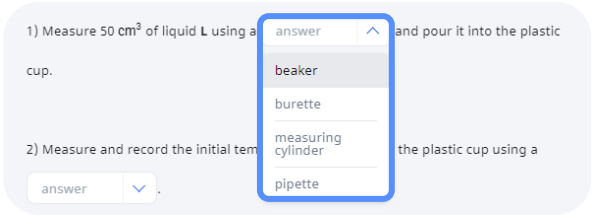
Spotlight of SLS Features

Encourage the 'thinking behind the doing' with pre-practical activities

Prerequisite activities such as reordering a set of jumbled procedures or completion of partial procedures could encourage students to **actively think** about steps in the experimental procedures.



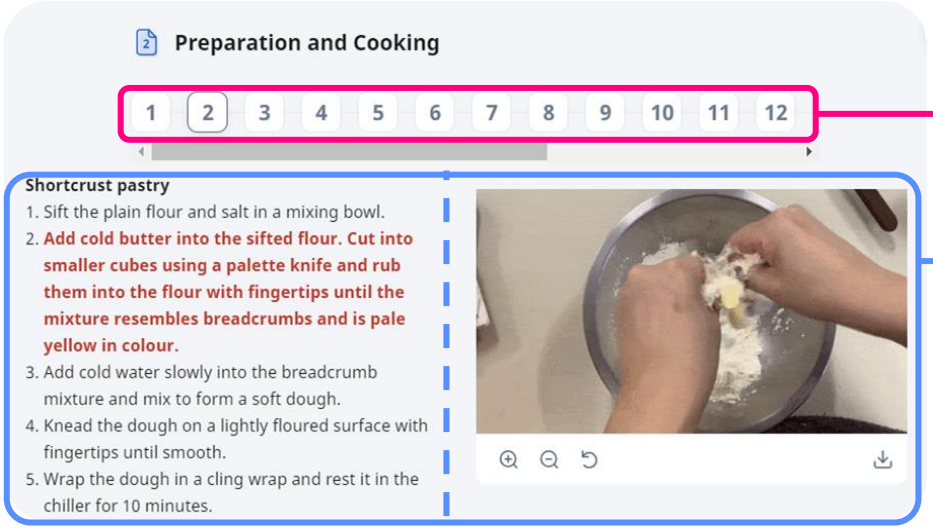
Reorder jumbled procedures using click-and-drop questions



Complete procedures using fill-in-the-blanks questions

Enhancing learning with accessible bite-sized multi-modal instructions

Replayable videos and/or animation enable students to **self-pace** and **revisit demonstration to self-help** as necessary, providing **greater clarity**. It also enables the teacher to focus on more complex guidance.

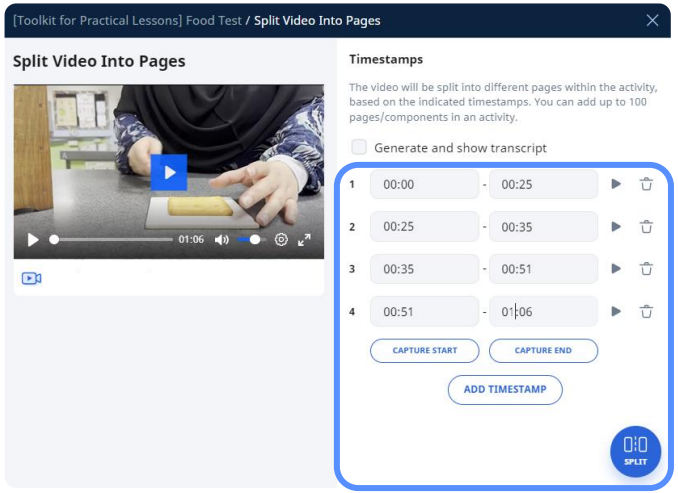


Chunking step-by-step instructions using paginated activity

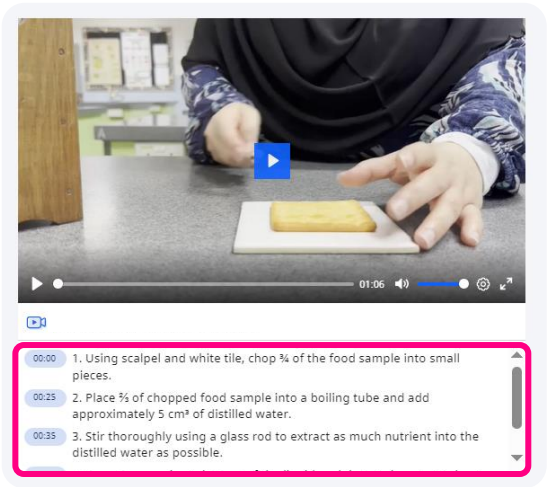
Present multi-modal instructions (textual and visual) using 2-column display

Enhancing learning with accessible bite-size multi-modal instructions

Bite-sized videos help students to **follow instructions better** and be **more engaged** as they **receive instructions in a timely manner** while performing the task.



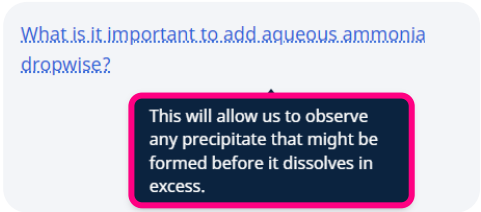
Split video into step-by-step lengths across paginated activity



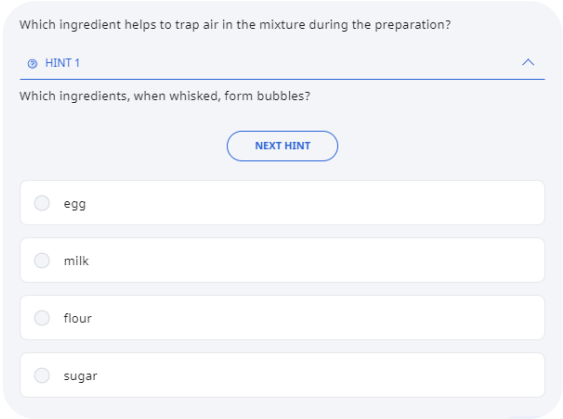
Split video into step-by-step lengths anchored to a timestamp using transcript

Encourage the ‘thinking behind the doing’ with just-in-time questions

Questions about the purpose behind the steps could be displayed alongside the experimental procedure to **cultivate active thinking** with explanation provided on hover to support students.



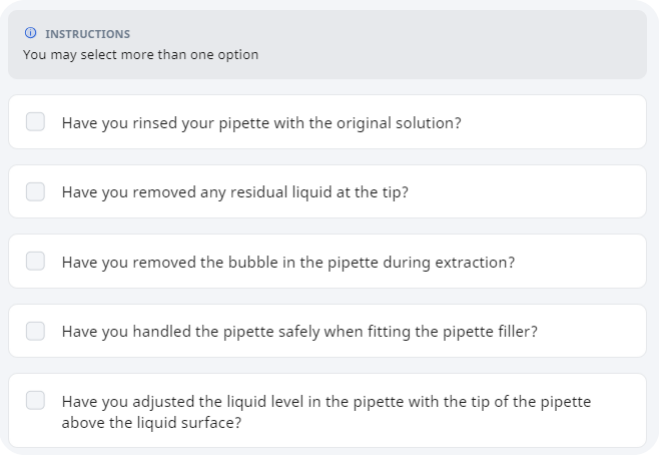
Encourage thinking within procedure using tooltips



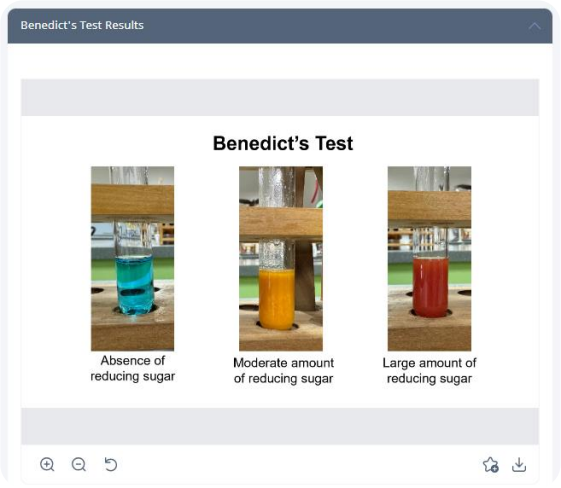
Check for understanding using multiple-choice questions

Empowering students to monitor their progress with scaffolds

Provision of checklists and additional hints to **facilitate self-help** and **familiarise students with the experimental task.**



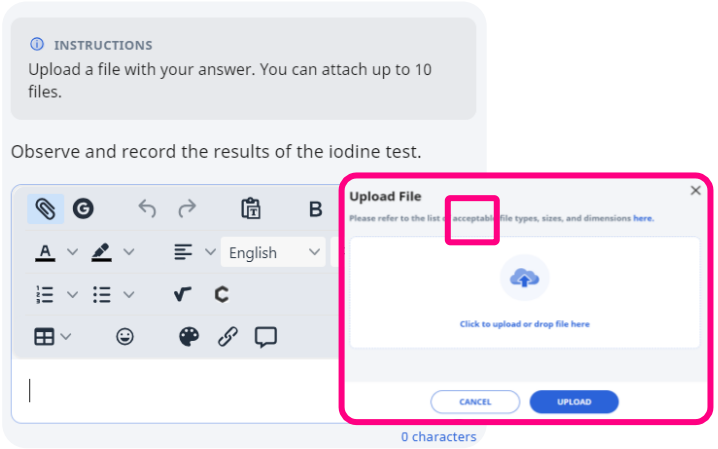
Provide procedural checklists using multiple choices questions



Provide optional references using accordion view

Empowering students to monitor their progress with visual references

Images of visual observations support students in their **reviewing their experimental tasks and results** during and after the practical lesson.

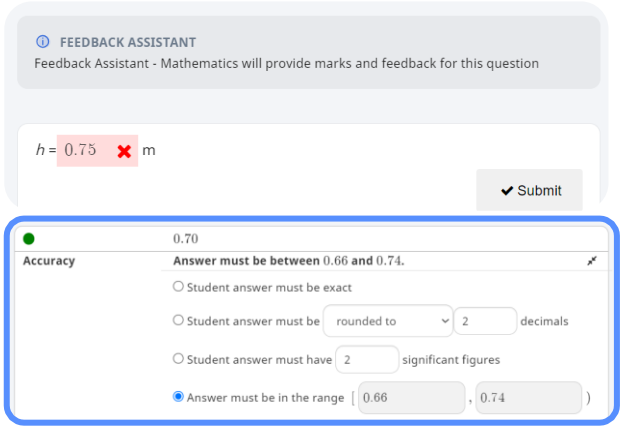


Keep a record of **key** experimental observations by uploading media

Provide images of expected observation via suggested answer

Supporting students to monitor their progress with specific and timely feedback

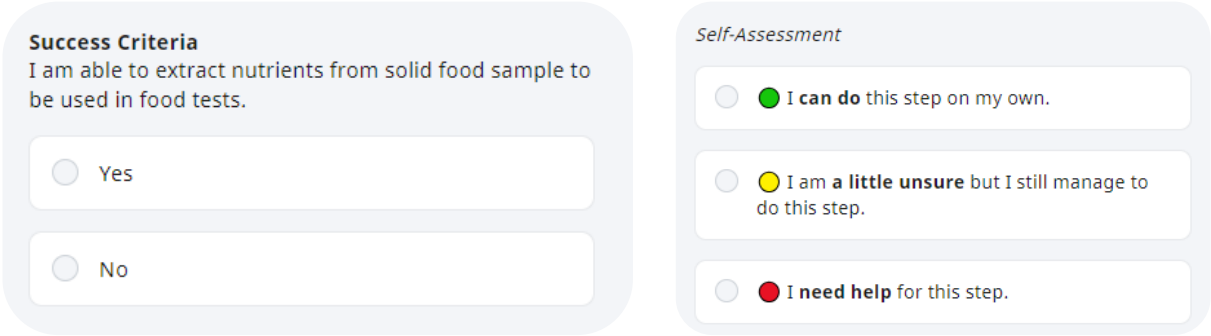
Feedback that students could receive upon submission provides them with assurance and opportunities to take corrective action during the lesson.



Check accuracy of quantitative measurements using FA-Math

Facilitate students' reflection of learning with self-assessment

Success criteria help students to be aware of their learning goals while allowing teachers to gain awareness of students' level of confidence.

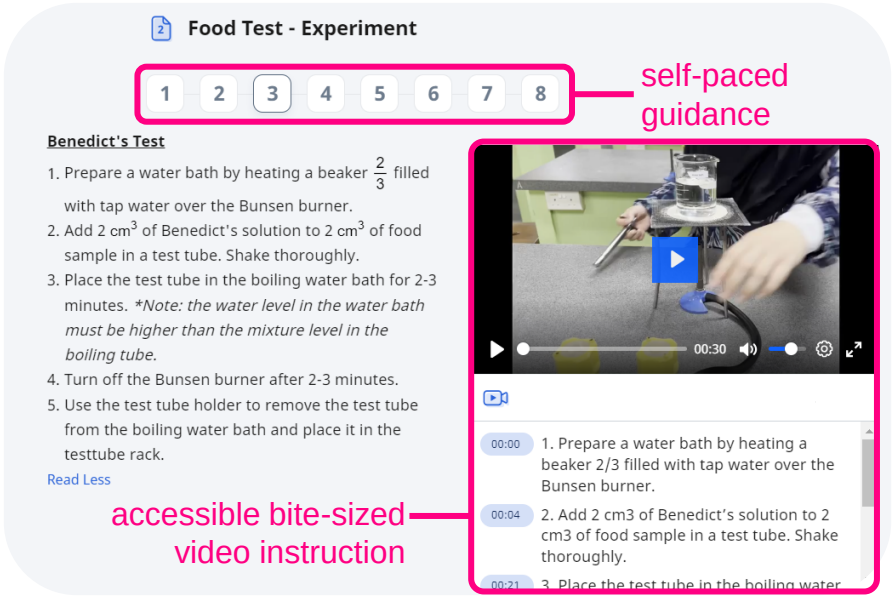


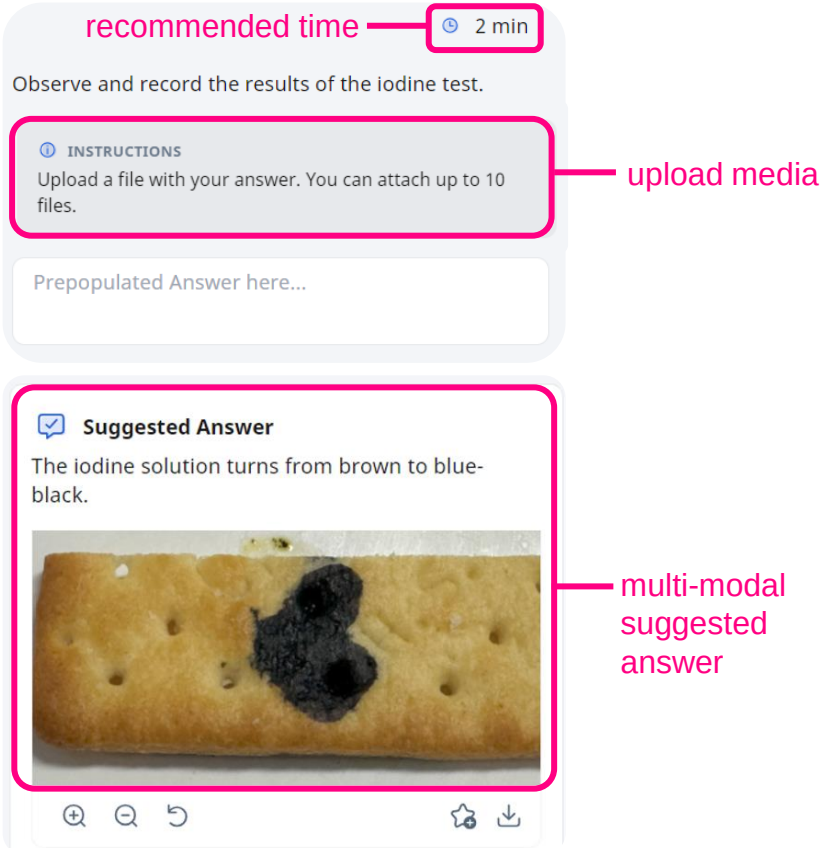
Self-assessment using multiple-choice questions

Sample SLS Modules

Find out how more about the features in the Sample SLS modules co-designed with teachers from our partner schools

Biology – Food Test





Chemistry – Qualitative Analysis

Test 5

Add about 1 cm^3 of solution **X** in a test-tube.
To this test-tube, add an equal volume of dilute nitric acid, followed by a few drops of aqueous barium nitrate.

Record your observations.

What is the purpose of adding dilute nitric acid?

Read L...

It is to remove the presence of interfering ions (if any).

Type answer here

tooltips questions

Suggested Answer

The solution changes from [colourless to brown].

A colourless and odourless gas evolved. Gas evolved relights glowing splint.

multi-modal suggested answer

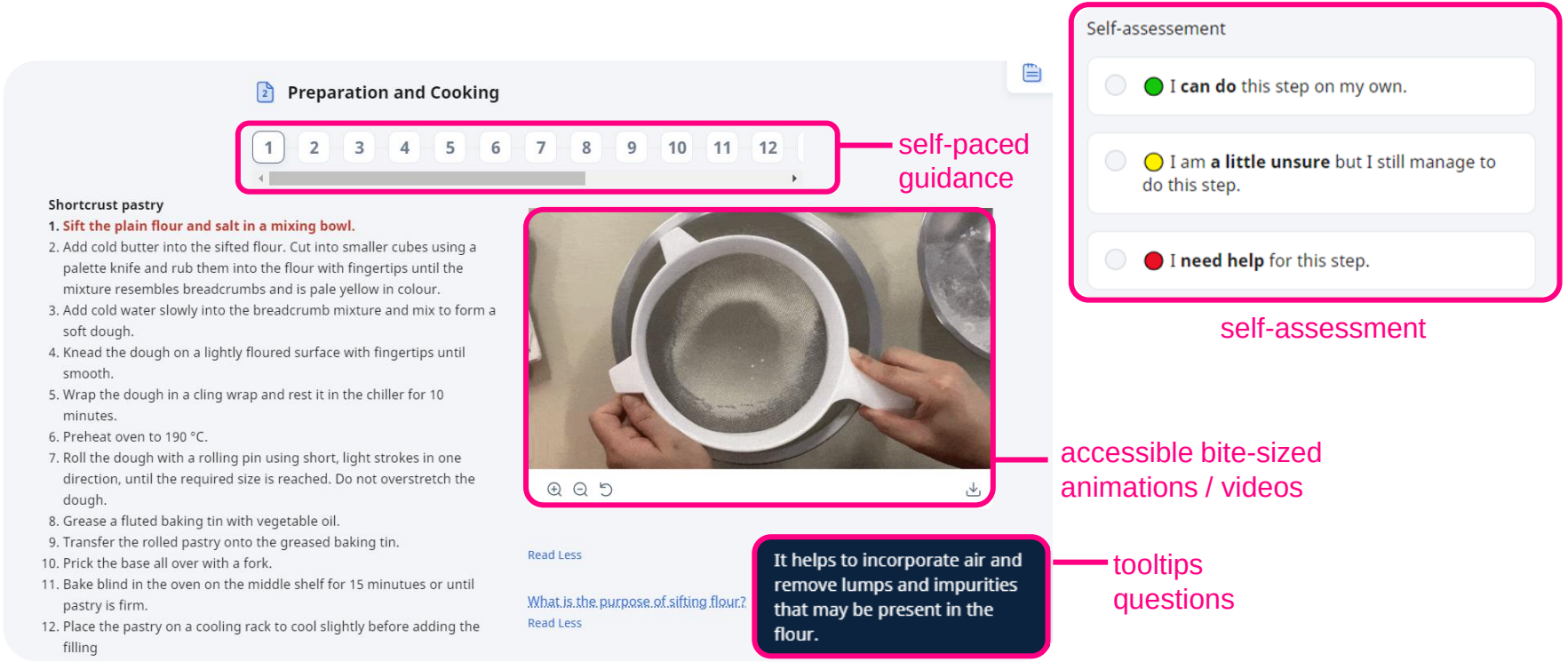
Qualitative Analysis Notes

Notes for anions

anion	*test*	*test result*
carbonate (CO_3^{2-})	add dilute acid	effervescence, carbon dioxide produced
chloride (Cl^-) [in solution]	acidify with dilute nitric acid, then add aqueous silver nitrate	white ppt.
iodide (I^-) [in solution]	acidify with dilute nitric acid, then add aqueous silver nitrate	yellow ppt.
nitrate (NO_3^-) [in solution]	add aqueous sodium hydroxide, then aluminium foil; warm carefully	ammonia produced
sulfate (SO_4^{2-}) [in solution]	acidify with dilute nitric acid, then add aqueous barium nitrate	white ppt.

reference notes using accordion view

Nutrition and Food Science – Quiche



Thank you!