

Isaac Physics Teacher CPD

Follow up:
developing your teaching with
isaacphysics.org



This session's objectives:

- › using the **Specification Table** to find syllabus-appropriate questions
- › using **quizzes** (also see Consolidation Programme)
- › using the spreadsheet for **GCSE Boards for Lessons** and making your own boards
- › **cloze text** for lessons and revision
- › Our lessons for **remote learning**
- › **Maths resources**: Mastery questions, Practise Maths & Master Mathematics
- › opportunities for students e.g. **mentoring, Challenges** and **Masterclasses**
- › using **spreadsheets** for displaying results
- › **You will be guided to explore the resources on Isaac additional to the text books.**



Equation editor: Algebra

Help Video



youtu.be/9674mtN2Mvc

- › Use mouse/touch to answer symbolic questions

Find an expression in terms of d and θ for the length of the path PRS.

Click to enter your answer

or type your formula here

The following symbols may be useful: $\cos()$, d , n , $\sin()$, $\tan()$, θ

Check my answer

[Link to question](#)

numbers variables operators, equals, fractions functions (trig, logs)

n θ

$1\ 2\ 3$ $Ab\ \Delta\ \gamma$ $+ - \sqrt{x}$ $\sin\ \int$

$2\ n\ d\ \sin\ ()$

?

Find an expression in terms of d and θ for the length of the path PRS.

HIDE QUESTION

$2nd$ $>$



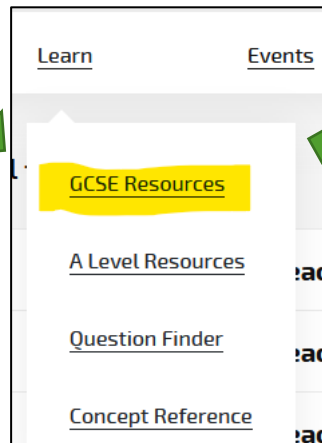
Using the Specification Table to find syllabus-appropriate questions

- › Follow either path to find the specification table for GCSE:



Show me resources for...

GCSE



Physics Skills Mastery



Check your answers to our Mastering Essential GCSE Physics book.

Mastering Essential GCSE Physics

By A.C. Machacek & K.O. Dalby, with extra questions written by R. Meikle
These exercises help students master the concepts of GCSE physics.
Includes worked examples and guidance.
GCSE grades 9-4/5.
Includes extension materials (beyond GCSE, indicated by ♥)

Buy the book

Printed copies, cost price £1 (plus p+p)

[Buy Isaac Books](#)

For Teachers

Specification Table - maps the book to your exam board.

Teacher Guidance Notes - by A. Machacek, K. Dalby, A Davies.

Cloze text version - project or print; students provide keywords to fill the gaps.

Set a section for homework

Apple/Learn GCSE or Learn/ GCSE Resources/Physics Skills Mastery/Specification table

https://isaacphysics.org/pages/phys_book_gcse_syll_map (copy into SOW for ref)

7 English and Welsh specifications are here – we are planning to include the Scottish and Irish specifications as soon as possible. You can also sort by book chapter.



Using the Specification Table to find syllabus-appropriate questions

[Home](#) > Mastering GCSE Physics by Exam Board

Mastering GCSE Physics By Exam Board

https://beta.isaacphysics.org/pages/phys_book_gcse_syll_map



Using the tables below you can set homework in just 3 clicks.

Link to paste

To set a section for homework and auto-marking by Isaac

1. Click on the **number** of the section you wish to set.
2. You will be taken to your "set assignments" page where the section will appear in the top left square. Click on "**Assign** / **Unassign**" to see a drop down list of your groups.
3. Click on the **group name** and "**Assign to group**".

By Book Chapter

AQA

EdExcel

OCR A

OCR B

Eduqas

WJEC

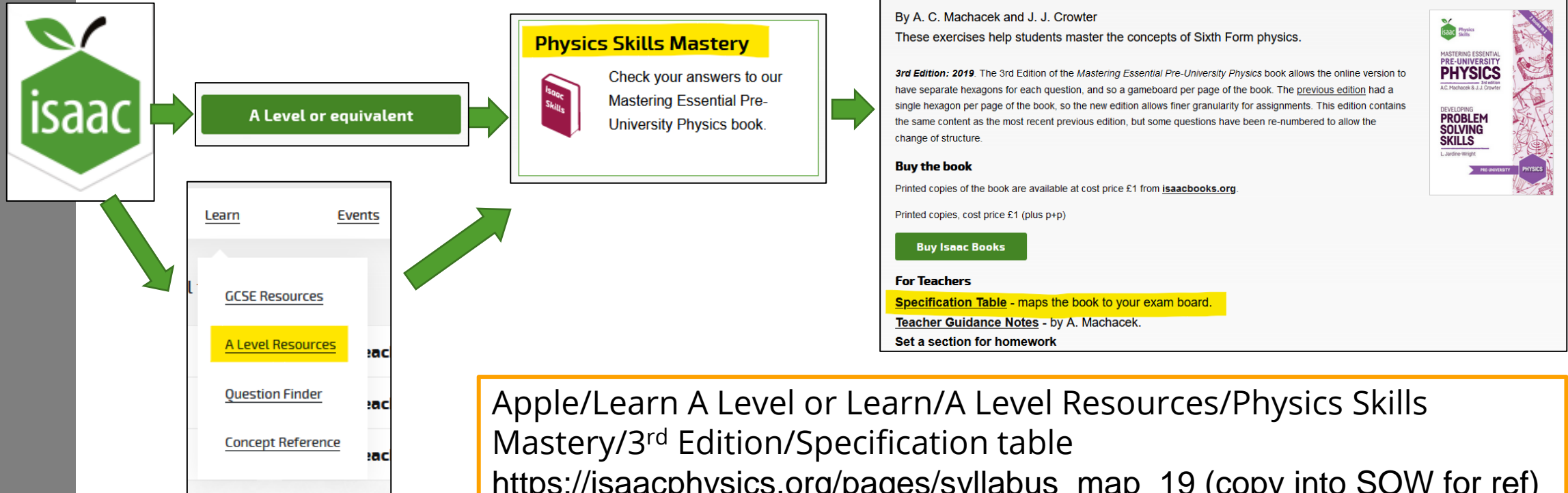
CIE IGCSE (2019)

Book Section (assign)	Topic (view)	AQA (2016-)	EdExcel (2016-)	OCR A (2016-)	OCR B (2016-)	
Chapter 1	Skills					



Using the Specification Table to find syllabus-appropriate questions

› Follow this path to find the specification table for A Level:



Apple/Learn A Level or Learn/A Level Resources/Physics Skills Mastery/3rd Edition/Specification table
https://isaacphysics.org/pages/syllabus_map_19 (copy into SOW for ref)
7 English and Welsh specifications are here – we are planning to include the Scottish and Irish specifications as soon as possible



Using the Specification Table to find syllabus-appropriate questions

Mastering Essential Pre-University Physics

Link to paste

https://beta.isaacphysics.org/pages/syllabus_map_19



3rd Edition

By A. Machacek and J. Crowter

Support for Teachers - Specification Table

Thanks to A. Machacek we are now able to provide a mapping of each of the book pages (sheets) to 7 different specifications. Please click on the appropriate tab below to see your specification.

Click on the on the sheet link to set for homework (e.g. A1); you will be taken to the set assignments page with the sheet as the top left box ready to be assigned to your group/s.

AQA

CIE Pre-U

EdExcel

OCR A

OCR B

Eduqas

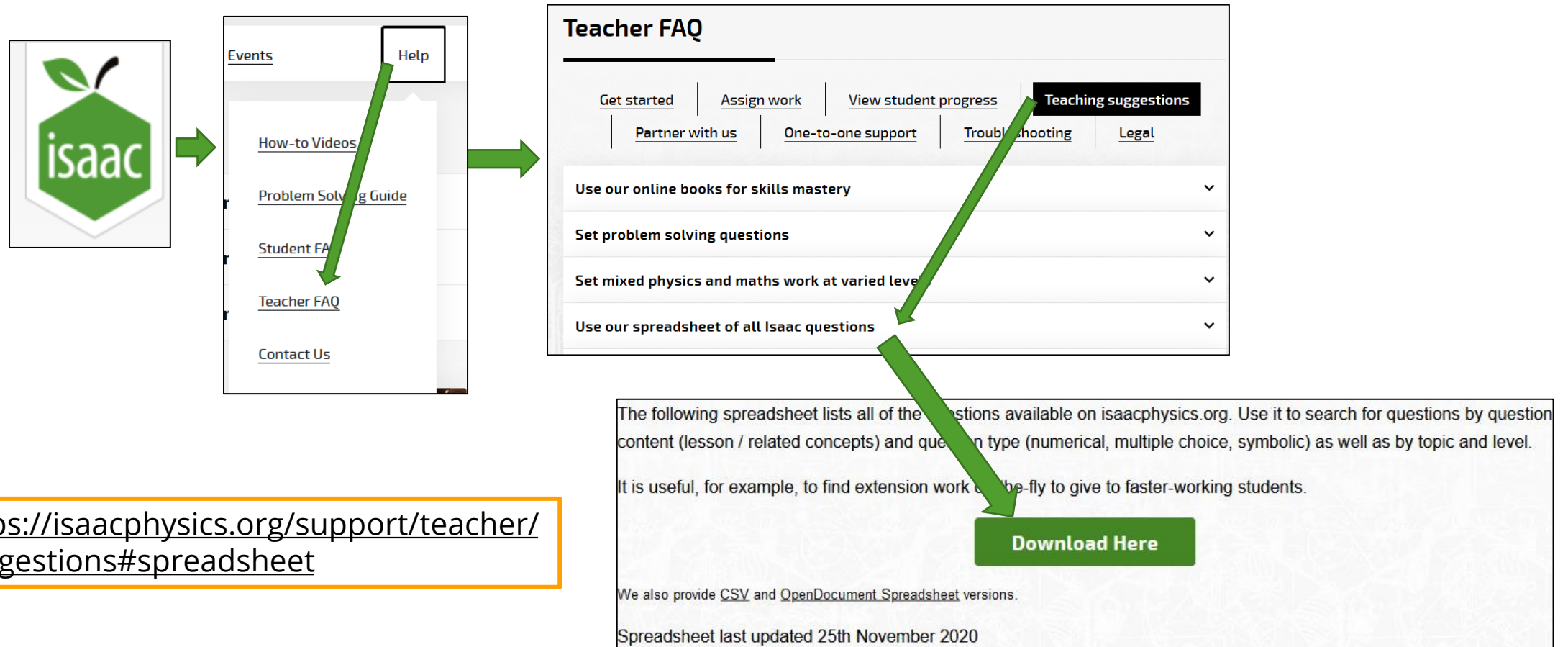
WJEC

AQA (2017-)	Sheet	Topic
Throughout	A1	Rearranging equations
1.1	A2	SI Units
1.1	A3	Standard form/prefix



Using the spreadsheet of Isaac questions to select appropriate questions by topic/level

- › Apple/Help/Teacher FAQ/Teaching Suggestions/Spreadsheet of all the Isaac Questions



<https://isaacphysics.org/support/teacher/suggestions#spreadsheet>



Using the Problem Solving Table to find questions by topic and level

- › Apple/Help/Teacher FAQ/Teaching Suggestions/Set problem solving questions/ Table

The diagram illustrates the navigation path from the isaac logo to the Problem Solving Questions table. It starts with the isaac logo, which leads to a sidebar menu. From the sidebar, a green arrow points to the 'Help' link. This leads to the 'Teacher FAQ' page, where a green arrow points to the 'Teaching suggestions' link. This leads to the 'Set problem solving questions' link, which then leads to the 'Problem Solving Questions' page. On this page, a green arrow points to the 'Table of problem-solving question topics' link. A red box labeled 'Link to copy' points to the URL https://isaacphysics.org/pages/problem-solving-questions_levels. The 'Problem Solving Questions' page also displays a table of topics and levels.

Teacher FAQ

[Get started](#) | [Assign work](#) | [View student progress](#) | **Teaching suggestions** | [Partner with us](#) | [One-to-one support](#) | [Troubleshooting](#) | [Legal](#)

Use our online books for skills mastery

Set problem solving questions

Set mixed physics and maths work at varied levels

Use our spreadsheet of all Isaac questions

Problem Solving Questions

https://isaacphysics.org/pages/problem-solving-questions_levels

There are 100s of problem solving questions accessible from the questions tab (top right). Here is a summary of the levels that exist for each topic. Click on the ticks to go to a set of questions at that topic at that level.

Physics Questions | **Maths Questions** | **Chemistry Questions**

Topic		Level					
		1	2	3	4	5	6
Mechanics	Statics	✓	✓	✓	✓	✓	✓
	Kinematics	✓	✓	✓	✓	✓	✓
	Dynamics	✓	✓	✓	✓	✓	✓
	Angular Motion				✓	✓	✓
	Circular Motion				✓	✓	

The Isaac Problem Solving questions are accessed from the questions tab (top right of the website). Whereas the Isaac Skills Mastery questions drill understanding of a particular topic, the problem solving questions aim to develop students' synoptic skills and help them apply their knowledge to tackle an unfamiliar situation. When trying these questions you can expect:

- wordy and descriptive questions
- less guidance/scaffolding (but hints provided)
- to construct your own diagram
- to work through multiple steps
- to apply more than one area of the syllabus

Students are required to think more deeply about how they apply core principles when solving these problems. Our problem solving questions are available at six different levels and cover a wide range of core A level topics.

Topics and Levels available

Click on the [Question Finder](#) page and use the filter to select topics and levels. 10 questions will be selected that match the topics and levels you have chosen. However, not all levels are available for all topics. This [table](#) provides a summary of which levels are available for each topic.

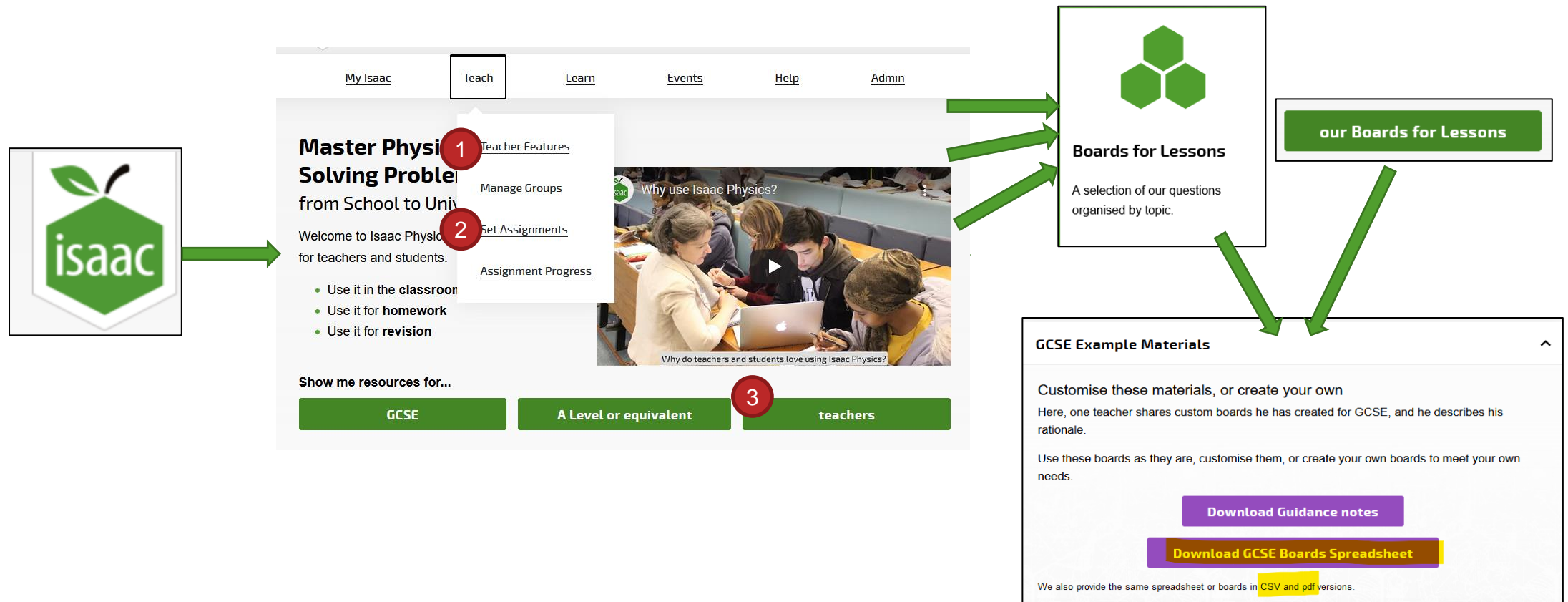
Table of problem-solving question topics

https://isaacphysics.org/pages/problem-solving-questions_levels



Using the spreadsheet for GCSE Boards for Lessons

- › Apple/Pod or Teach: Set Assignments or Teacher Features/ Set Assignments/our Boards for Lessons/ GCSE Example Materials-download GCSE Boards spreadsheet (3 routes at present)





Using the spreadsheet for GCSE Boards for Lessons

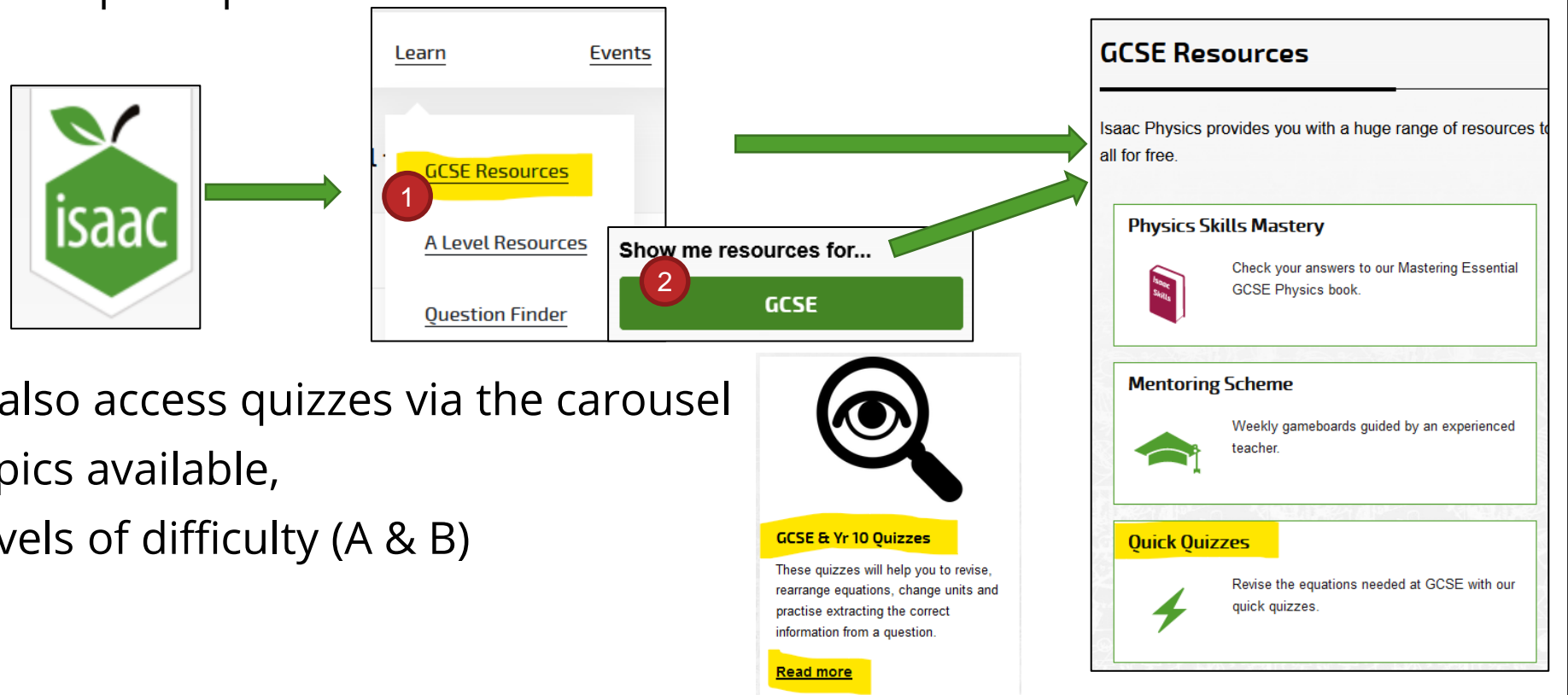
- › Spreadsheet has links to ready-made boards you can cut and paste into your SOW (already done for AQA GCSE Physics). There is a lot of guidance information.

AQA Spec ref.	Unit	Topic	Number of Questions	GCSE Book Page number	Number of Hexagons	Link	What type of question will the student face	What will the student achieve by completing this board	What skills will the student need to know to successfully complete each board
P2	Electricity	Charge and Current	11	67 - 68	3	https://isaacphysics.org/s/u82Ssw	Hexagon 22.4 is a straightforward drill practice table to complete. Hexagon 22.6 and 22.5 are worded questions.	Using $Q = It$ and improving students understanding of the term charge flow.	Conversion between time (minutes \rightarrow seconds), ability to understand standard form, as well as rearrangement of $Q=It$.
P2	Electricity	Charge and Current (Application Questions)	7	68	7	https://isaacphysics.org/s/UE1Xhm	Worted exam style questions. (22.16 and 22.17 are online only)	Using $Q = It$, applied in a variety of scenarios.	Conversion between time (minutes \rightarrow seconds), ability to understand standard form, as well as rearrangement of $Q=It$.
P2	Electricity	Voltage and Current in series and parallel	9	70 - 71	5	https://isaacphysics.org/s/t2w8JD	Each hexagon corresponds to a circuit diagram. Students are required to input an value.	Most students will be challenged by circuit diagrams and often get confused about the circuit rules. This board will certainly consolidate and assess their understanding.	Understanding of current/voltage circuit rules in series and parallel.
P2	Electricity	Voltage and Current in series and parallel (Hard)	3	72	3	https://isaacphysics.org/board/a9f780cf-ff0f-409f-9eaa-b26d17e76772	Each hexagon is represented by a circuit diagram. Students are required to input an value.	More complex circuit diagrams, extending and deepening student understanding of circuit rules.	Understanding of current/voltage circuit rules in series and parallel.
P2	Electricity	Resistance $V=IR$	11	73 - 74	6	https://isaacphysics.org/s/rawRZ	Hexagon 24.1 is a straightforward drill style question. Hexagons 24.2 to 24.6 are worded style exam questions.	Improve use of the basic $V=IR$ formula as well as extension when there are non-identical components in a circuit. Often this is above most GCSE Exam boards.	Lots of prefix use, rearrangement of $V=IR$, and knowledge of circuit rules in a series and parallel circuit.



Using quizzes

- › Quizzes are great for starters, plenaries, revision and short, low demand homework tasks
 - Currently only available for GCSE – developing resource
- › Apple/GCSE/quick quizzes



- › You can also access quizzes via the carousel
- › Some topics available,
- › with 2 levels of difficulty (A & B)



Using quizzes

GCSE/Year10 Quizzes

link

https://isaacphysics.org/pages/gcse_quizzes



Topics

Topic	Quiz A	Quiz B
Acceleration	start	start
Current and Charge	start	start
Density	start	start
Electrical Power	start	start
Gravitational PE	start	start
Kinetic Energy	start	start
Momentum	start	start
Radioactivity: half-life	start	start
Resistance	start	

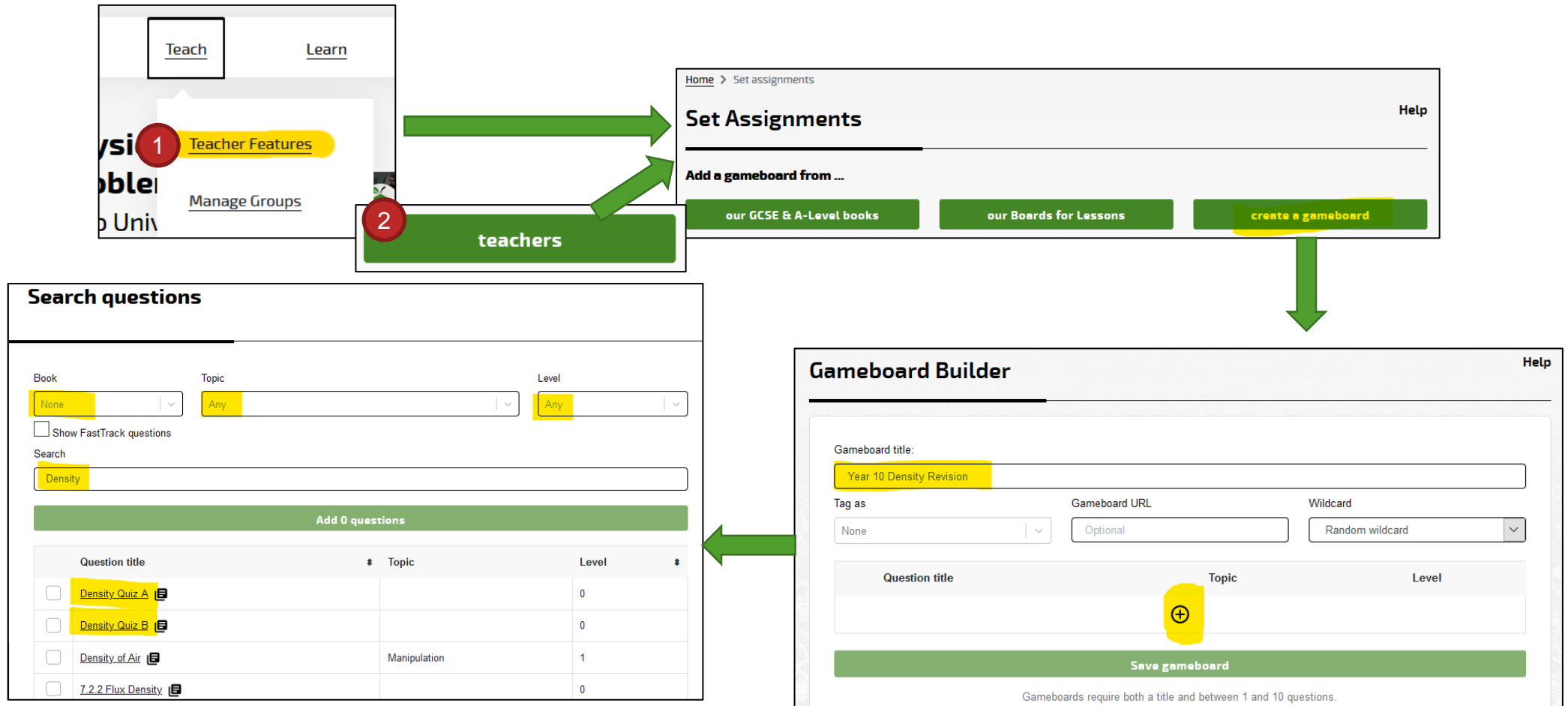
Try these new topic quizzes to practise the equations needed for GCSE

The quizzes will help you to revise, rearrange equations, change units and practise extracting the correct information from a question.

- Typically 10 – 12 questions in each quiz to provide practice in numerical work.
- Quiz A (~10-15 mins) is simple substitution, rearranging and choosing the correct units, and should be possible without a calculator.
- Quiz B (~15 mins or a little longer) is similar, but generally requires a calculator and requires a little more effort to extract the information from the question.

Using quizzes

- › You can include quizzes in a board if “all levels” selected
 - › search questions for the word “quiz”



Teach **Learn**

1 Teacher Features

2 teachers

Home > Set assignments

Set Assignments

Help

Add a gameboard from ...

our GCSE & A-Level books our Boards for Lessons **create a gameboard**

Search questions

Book: None Topic: Any Level: Any

☐ Show FastTrack questions

Search: Density

Add 0 questions

	Question title	Topic	Level
<input checked="" type="checkbox"/>	Density Quiz A		0
<input checked="" type="checkbox"/>	Density Quiz B		0
<input type="checkbox"/>	Density of Air	Manipulation	1
<input type="checkbox"/>	7.2.2 Flux Density		0

Gameboard Builder

Help

Gameboard title: Year 10 Density Revision

Tag as: None Gameboard URL: Optional Wildcard: Random wildcard

Question title	Topic	Level

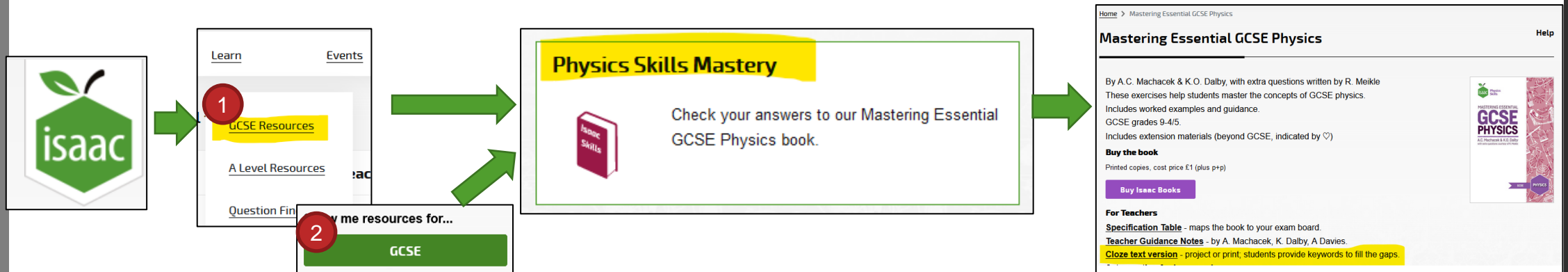
Save gameboard

Gameboards require both a title and between 1 and 10 questions.



Cloze text for lessons and revision

- › Apple/GCSE or Learn: GCSE Resources/Physics skills mastery/cloze text version

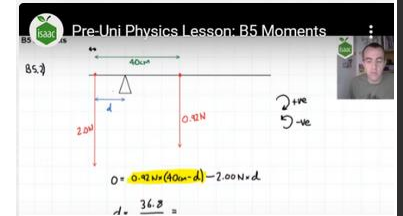


- › https://cdn.isaacphysics.org/isaac/books/isaac_gcse_physics_book_teacher_version.pdf
- › Gapped text for GCSE book: good for cover lessons, EAL students and students with SpLD (dyslexia)



Our lessons for remote learning

- › Isaac Physics has complete, ready-made lessons for remote learning at GCSE and A Level.
- › These can be used as online lessons for live teaching and for independent work.
- › Format:
 - Introduction video(s),
 - questions to answer online, with interactive feedback and automatic marking (a hard copy can be printed off if necessary),
 - help via concept pages,
 - A recorded tutorial going through the full written solutions for the questions.
- › Where do I find them?
 - 2nd pod on Homepage
 - 3rd box in GCSE and A Level Resources



Lessons for remote COVID-19 learning

Packaged by topic and ready for self-learning or teaching. Virtual lessons blending into videos, explanations, auto-marked questions and tutorials.

[Read more](#)

Virtual Lessons



Learn and practise physics.

Virtual Lessons



Learn and practise physics.

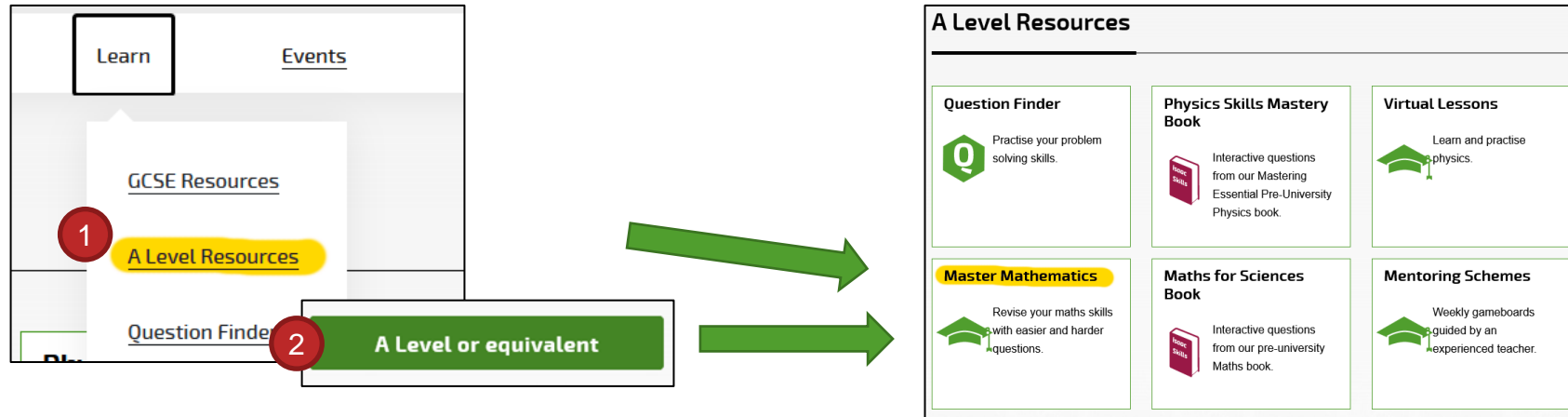
Master Mathematics

Help Video



youtu.be/9674mtN2Mvc

- › Apple/Learn A Level or Learn A Level Resources/Master Mathematics



- › Pure Maths and Mechanics revision boards for Year 1 and Year 2 of A Level
- › Option of extra practice questions
- › Progression to problem solving

Challenge and practice

Once you have worked through the Pure Maths

- Year 1: level 4 and 5 maths and physics
- Year 2: level 5 and 6 maths and physics



Master Mathematics

see Practise Maths for boards of the individual questions

Help Video



youtu.be/9674mtN2Mvc

link

Home > Mechanics Stage 1 - Revision & Practice

Mechanics Stage 1 - Revision & Practice

Q	Two Particles on a Pulley	Maths	Level 3	>
Q	Kinematics & Calculus	Maths	Level 3	>
Q	Particle on a Surface	Maths	Level 3	>
Q	Pulley with Three Masses	Maths	Level 3	>
Q	Friction	Maths	Level 3	>
Q	Projectiles and a Lift	Maths	Level 3	>
Q	Forces in Vector Form	Maths	Level 3	>
Q	Motion of a Train	Maths	Level 3	>
Q	Kinematics Graphs	Maths	Level 3	>
Q	Learning Zone: Resolving Forces	Maths	Level 3	>

Set as assignment Duplicate and edit



Curves and Integration

Level 3

https://isaacphysics.org/questions/fasttrack_stage1_q3_2018

Part A Working back from $\frac{d^2y}{dx^2}$

A curve has an equation which satisfies $\frac{d^2y}{dx^2} = 3x^{-\frac{1}{2}}$. The point $P(4, 1)$ lies on the curve, and the gradient of the curve at P is 5.

Find $\frac{dy}{dx}$.

Click to enter your answer

or type your formula here ?

The following symbols may be useful: Derivative(x , y), x , y

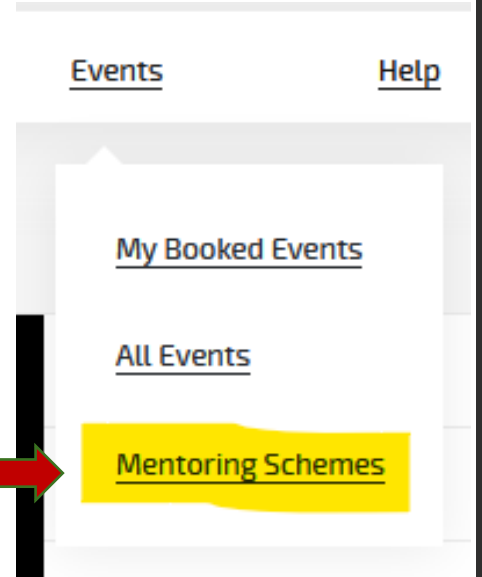
Easier question? Check my answer

2 levels of easier questions are available to build confidence

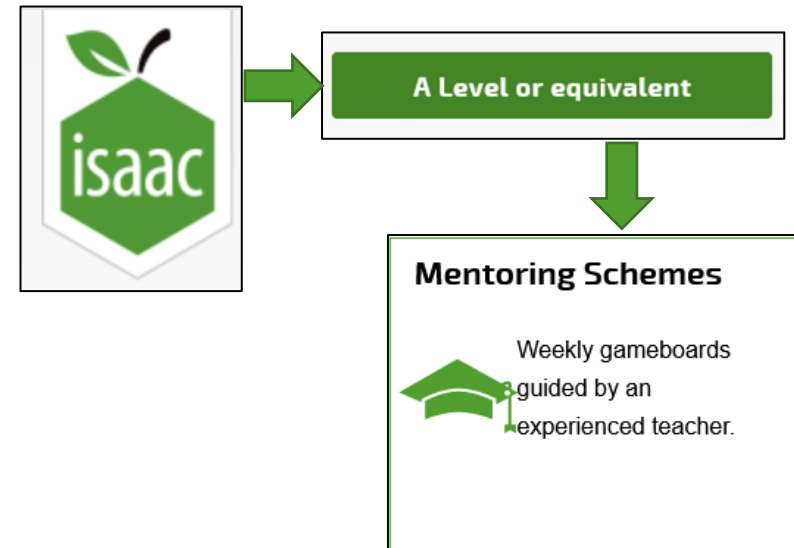
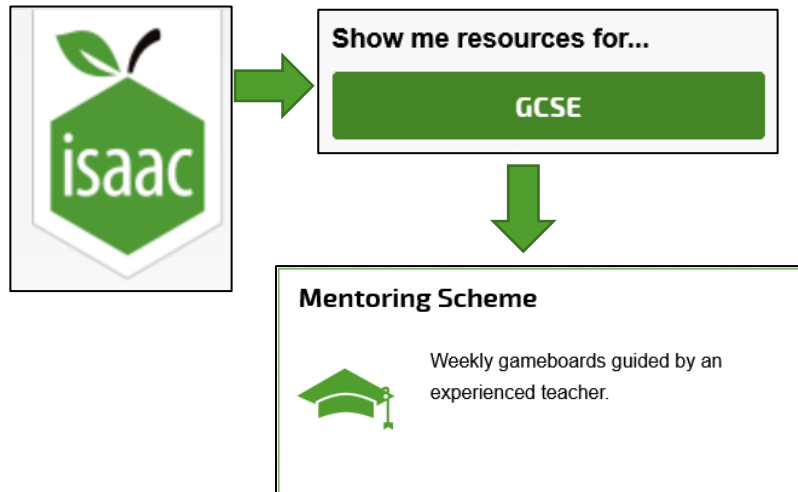


Opportunities for students: Mentoring

- › Isaac Physics offers online mentoring schemes for all students in Years 11-13 to develop their physics skills.



From menu bar:



Opportunities for students: Mentoring

Isaac Physics offers online mentoring schemes for all students in Years 11-13 to develop your physics skills.

The scheme for the 2020-21 academic year is now OPEN for registration.

To join the scheme, see below.

You need to join a new year group for the one starting in September. You can join anytime; catch-up or just join in now - it doesn't matter. Just do some questions!

- As a student and / or teacher you can have a direct interaction with one of the Isaac Physics team.
- Each week (including through school holidays) your mentor will set a small task - a set of questions, that are at a mixed level (book questions and Level 1 to 6 questions through the year) that should take about **one hour** to attempt.
- Tutorials that have been recorded will be deleted on a termly basis.
- The questions are for YOU and NOT for your teacher! If you really are stuck, ask us for help.



Tutorial Pages

The Reward - Why Join the Scheme?

How Do I Join?

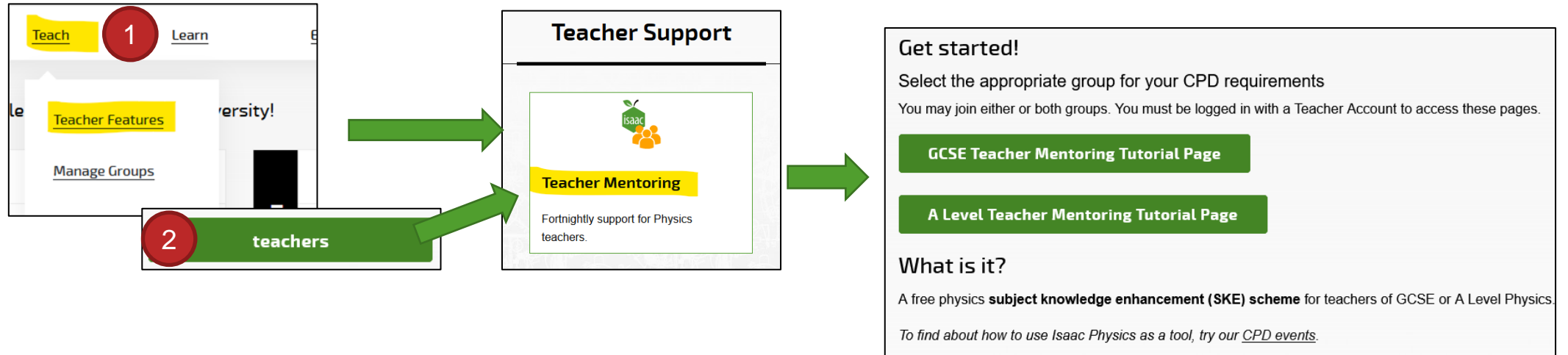
Once you have signed up to a particular mentoring scheme group, you can use the following pages in order to watch the tutorials and check on the work set.

- [Y11 Mentor Group Page](#)
- [Y12 Mentor Group Page](#)
- [Y13 Mentor Group Page](#)



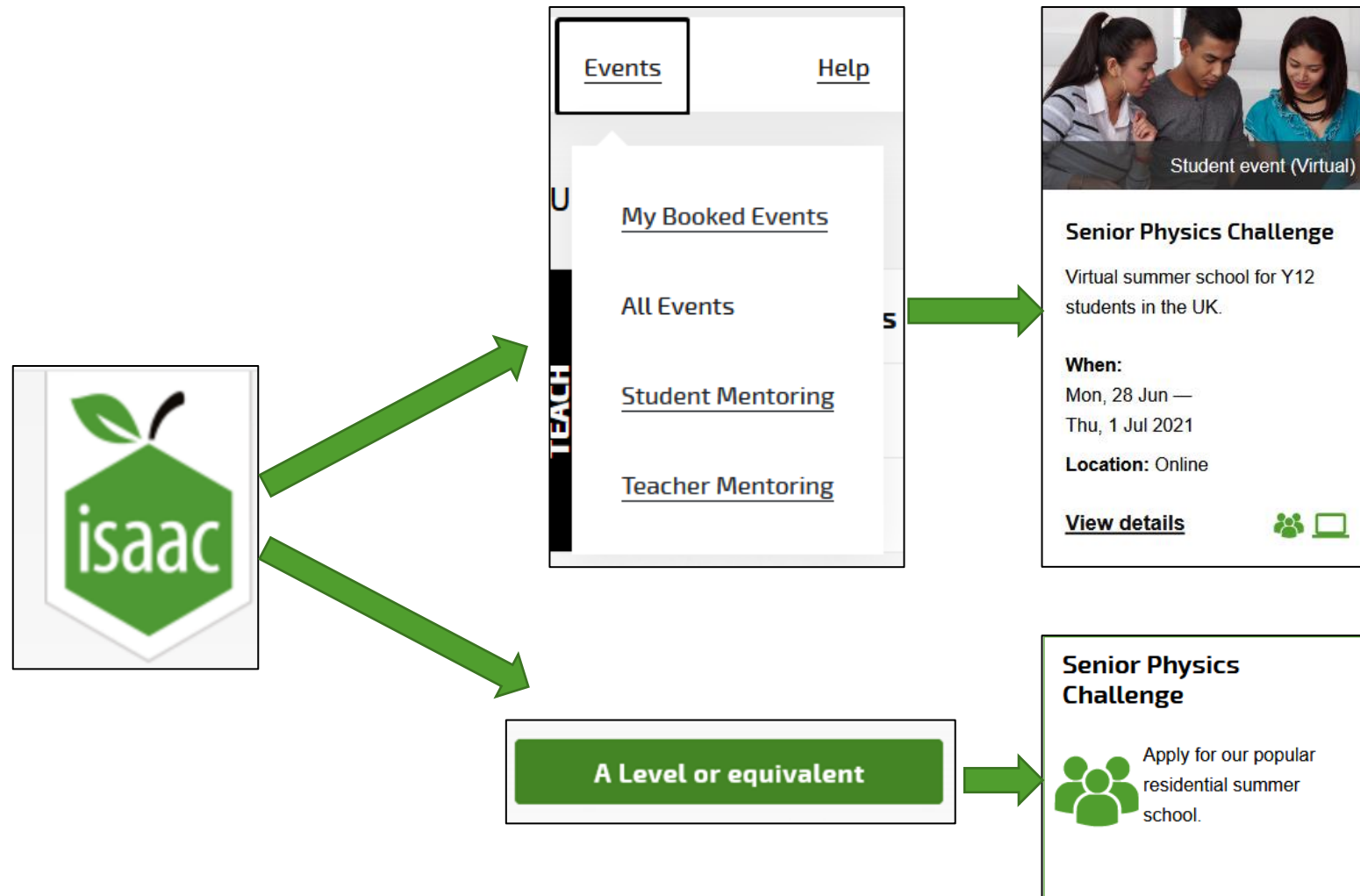
Opportunities for Teachers: Mentoring, Subject Knowledge Enhancement (SKE)

- › Isaac Physics offers online mentoring schemes for teachers covering the GCSE and A Level Physics Mastery books.





Opportunities for students: Challenges






Opportunities for students: Challenges contd.



A Level or equivalent




Additional Resources




Physical Chemistry Mastery

Check your answers to our Mastering Essential Pre-University Physical Chemistry book.




Events

Find one of our face-to-face or virtual events.




Extraordinary Problems

Apply your physics skills to model real, complex situations.




Solving Physics Problems

A practical guide to solving unfamiliar problems using pre-university Physics.



Senior Physics Challenge

Apply for our popular residential summer school.



Quantum Mechanics Primer

A first year university introduction to quantum mechanics.



Extraordinary Problems

In this section we feature problems that as physicists we solve using the concepts and examples explored in the other areas of this site.

Other examples are: How banked tracks allow cyclists and vehicles to travel faster when cornering (<http://www.bbc.co.uk/news/magazine-19166035>), and what the optimum speed to travel on a motorway is to avoid traffic jams (<http://www.bbc.co.uk/news/magazine-15620146>).

Monster Truck Front Flip



Rugby World Cup 2015



Wimbledon




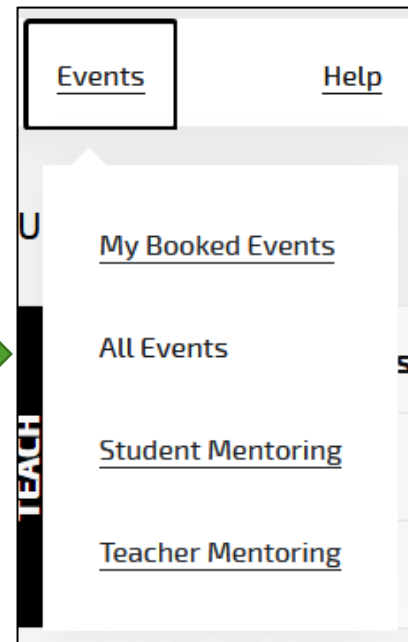
The Rosetta Mission





Opportunities for students: Masterclasses

- › Intense workouts for students to practice and improve their grades
- › Held regularly
- › From Y10 to Y13






Teacher and Student event (Virtual)

Y11 Physics Virtual Masterclass

3 hour event to practise GCSE Physics

When:
Sat, 27 Feb 2021
10:00 — 13:00

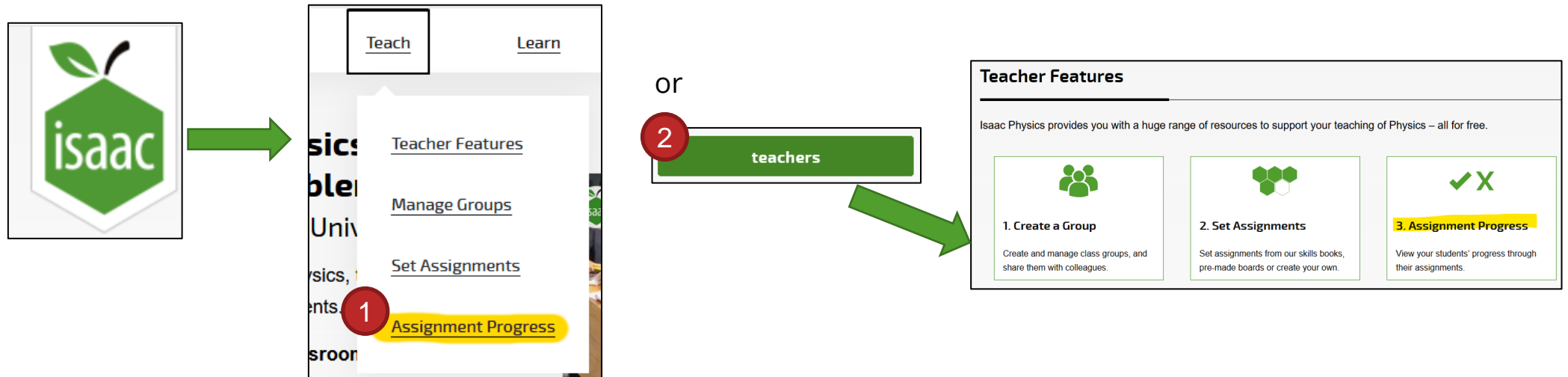
Location: Online

[View details](#)   

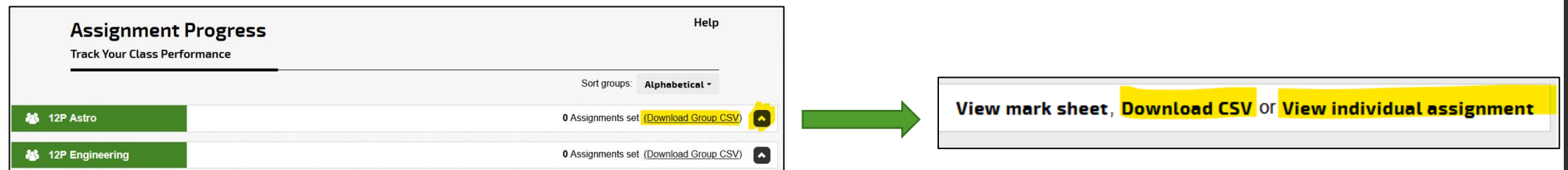


Using spreadsheets for displaying results

- › Apple/menu/assignment progress or Teach: Teacher Features/download group csv (paste into your spreadsheet)



- › Or click down arrow for individual assignment class results





Using spreadsheets for displaying results

100% correct $\geq 75\%$ correct $< 75\%$ correct Not attempted $> 25\%$ incorrect

Colour-blind ☐ Percent view ☐

100% correct $\geq 75\%$ correct $< 75\%$ correct Not attempted $> 25\%$ incorrect

Colour-blind ☒ Percent view ☐

Download CSV

2 of 2 students have completed the gameboard A Level Pot-Pourri correctly.

Question: Sketching graphs of sin and cos squared

▶

▲▼	100%	▲▼	100%	100%	100%	100%	100%	100%	100%	100%	100%	Total Parts ▲▼	Total Qs ▲▼
	4/4		7/7	1/1	13/13	1/1	2/2	2/2	1/1	4/4	2/2	37/37	10/10
	4/4		7/7	1/1	13/13	1/1	2/2	2/2	1/1	3/4	2/2	36/37	10/10
▲▼	100%	▲▼	100%	100%	100%	100%	100%	100%	100%	100%	100%	Total Parts ▲▼	Total Qs ▲▼



Thank you for attending this CPD!

- › Need support?
- › <https://isaacphysics.org/contact> anyone able to help will pick this up
- › ingrid@isaacphysics.org/ goes to Teacher Manager only
- › <https://www.talkphysics.org/groups/isaac-physics/> an Isaac community
- › Apply to join our WhatsApp community:
https://isaacphysics.org/support/teacher/suggestions#teacher_forums