

# How to Revise Science Effectively

## Step 1:

Know what is in the exams and plan a timetable to address all areas.

A timetable needs to be very specific to be effective.



# EXAM BOARDS PRE-RELEASE

- We have given all students a comprehensive list of the topics that will definitely be in each paper and a list of what will not be.
- They should use this list to prepare their revision timetable
- Teachers have produced a timetable for what is being covered in each lesson per week; it would be useful to match this with revision at home.



Week	Lesson content (Knowledge and skills)	HW and Revision
1 21/02	<b>L1: Paper 2 P8 Red-shift and The Big Bang</b> <b>L2: Paper 2 P8-Satellitea</b>	Seneca P8 Section Redshift and the Big Bang
2 28/02	<b>L1: Paper 2 P8 Orbital and Centripetal Force</b> <b>L2: P8 Assessment</b>	Seneca P8 Orbitals and Satellites
3 7/03	<b>L1: P6: Waves basics:</b> longitudinal vs transverse, wave speed and time-period equations <b>L2: P6 Reflection and Refraction theory</b>	Seneca P6 Waves
4 14/03	<b>L1: Required Practical. 9 – Reflection and Refraction, method and data handling.</b> <b>L2: Waves Assessment</b>	Seneca: P5 First half of Forces
5 21/03	<b>L1: P5 – Forces</b> scalars, vectors, contact and non-contact forces and basic force diagrams and resultant forces and work done <b>L2 P5 – Motion in a Straight line</b>	Seneca P5 Second Half of Forces
6 28/03	<b>L1: P5 – Momentum</b> <b>L2: Assessment</b>	Seneca P5 Momentum and Pressure

# Step 2: Intentional Study

Study Goals

Date	Subject	Task	Completed	Notes
7/03/2022	Science	Do Seneca chapter on P6 waves	Yes- Took 30-40 minutes.	Achieved average of 75% on activities. Repeat in two weeks and try to achieve at least 90%
8/03/2022	Science	Re-cap and answer questions on cell structure Biology.	Yes- Took 30 minutes.	Couldn't remember functions of ribosomes or mitochondria- Re-do these two again in 2 days.
9/03/2022	Science	Makes notes on C6 chemistry chapter in revision guide, then do Seneca C6 exam questions.		

- For successful study, it must be focused.
- Keeping a log of what has been covered, helps to keep revision on track.



### STUDYING CELLS

- Cells can be observed using microscopes such as
  - Optical microscopes
  - Laser scanning microscopes
  - Electron microscopes
- These microscopes produce high resolution, magnified images of specimens

**MAGNIFICATION**  
the number of times larger an image appears compared to the actual size of the object

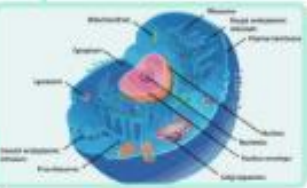
**RESOLUTION**  
the clarity of an image, the ability to distinguish between two points that are close together

**MAGNIFICATION = IMAGE SIZE / ACTUAL SIZE**

x100	m	x100
x10	cm	x10
x1000	mm	x1000
x1000	µm	x1000
x1000	nm	x1000

### EUKARYOTIC CELLS

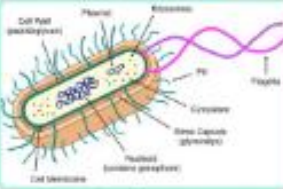
- Eukaryotic cells are complex and include
  - Animals
  - Plants
  - Fungi
- Have range of organelles with specific functions & most are membrane-bound



**ORGANELLES**  
components of cells which perform specific functions


### PROKARYOTIC CELLS

- Prokaryotic cells are the most common type of cell on Earth
- They are small cells which contain:
  - Cell membrane
  - Cell wall (made of peptidoglycan)
  - No nucleus (DNA in loop as plasmid and nucleoid)
  - Cytoplasm
  - 70s ribosomes
  - Glycogen granules & oil droplets (energy stores)
  - Cytoskeleton (less developed, no centrioles)
  - Flagellum (rotates for movement)
  - Capsule (protects from detection)
  - Pili (made of protein, for adhesion to host cells/prokaryotes)



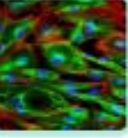
### OPTICAL MICROSCOPES

- First type of microscope
- A beam of light is focused with lenses to produce an image
- Relatively cheap
- Easy to use
- Can study WHOLE LIVING ORGANISMS
- Poor resolving power of 200nm due to the long wavelength of light
- Magnification of up to x1500



### LASER MICROSCOPES


- Also called confocal microscopes
- Laser light scans object point by point and computer assembles it into an image
- Can study WHOLE LIVING ORGANISMS
- More expensive than light microscopes
- Have depth selectivity so can focus on structures at different depths



**LASER SCANNING MICROGRAPH**


### ELECTRON MICROSCOPES

- Beam of electrons fired from cathode & focused with magnets
- Electron beam has short wavelength (0.004nm) so has a high resolving power
- Samples must be observed in a vacuum so only DEAD ORGANISMS can be studied
- Can be transmission electron (TEM) or scanning electron microscopes (SEM)
- Very large & expensive
- Require training & skill to use



**TRANSMISSION ELECTRON**

- Beam of electrons passes through specimen
- Forms 2D black & white image
- Specimen chemically fixed by being dehydrated & stained with metal salts



**SCANNING ELECTRON**

- Beam of electrons bounce off the specimen's surface
- Forms 3D black & white image but computers can add colour
- Specimen placed in vacuum & often coated in fine metal film

### 2.1 cell structure MICROSCOPY & CELLS

### STAINING SPECIMENS

- Some structures are easy to see with a microscope (eg chlorophyll naturally modifies light)
- Other structures must be stained to be seen
- Dye is used to highlight cells and their structures which makes them easier to see with a microscope
- Stains bind to different types of molecules or cell structures which allows different components of cells to be identified -> DIFFERENTIAL STAINING

<b>SUDAN RED</b> stains lipids	<b>ACETIC ORCEIN</b> binds to DNA allows chromosomes & nucleus to be seen	<b>IODINE</b> stains starch granules purple & plant cell walls yellow
<b>EOSIN</b> stains cytoplasm		

	OPTICAL	LASER	TEM	SEM
<b>BEAM</b>	Light	Light	Electrons	Electrons
<b>PREPARATION</b>	Simple	Simple	Stain & metal film	Stain
<b>SPECIMEN</b>	Alive	Alive	Dead	Dead
<b>MAGNIFICATION</b>	x1500	x1500	x1,000,000	x100,000
<b>RESOLUTION</b>	200nm	160nm	0.1nm	10nm
<b>2D OR 3D?</b>	2D	3D	2D	3D
<b>COLOUR?</b>	Colour	Colour	False colour	Black & white

	NUCLEUS	DNA	CYTOPLASM	CELL MEMBRANE	MEMBRANE BOUND ORGANELLES	RIBOSOMES	CELL WALL
<b>EUKARYOTE</b>	Present	Linear	Present	Present	Present	Larger	Cellulose/chitin
<b>PROKARYOTE</b>	Absent	Circular	Present	Present	Absent	Smaller	Peptidoglycan

# Revision Sequence. Stage 1 Summarise key information

Pictures and summary tables are important.

Focus on information that needs to be memorised.



## P1 - Energy Part 1

Write down four energy stores?

- 1
- 2
- 3
- 4

What is meant by work done?

State the conservation of energy principle

Describe the energy transfers that occur with a falling object

State the equation for calculating the kinetic energy of a moving object and give the units for each component

Calculate the kinetic energy if a 500kg mass is moving at 12m/s

Define power

State two equations used to calculate power.

What is gravitational potential energy?

What is the equation for calculating GPE?

If a 2kg mass is lifted 0.4 meters how much GPE does it gain?

What is the definition of specific heat capacity

Describe and experiment to find the SHC of a block of aluminium

State the equation used to calculate efficiency

Give four ways of insulating a house against energy loss

What is meant by thermal conductivity?

How can machines be made more efficient?



We have  
question based  
revision  
summary sheets  
for students who  
find it difficult to  
identify the key  
information



There are many websites that can help support the initial stage of summary notes.

They help with explanations as well.

ASPIRATION

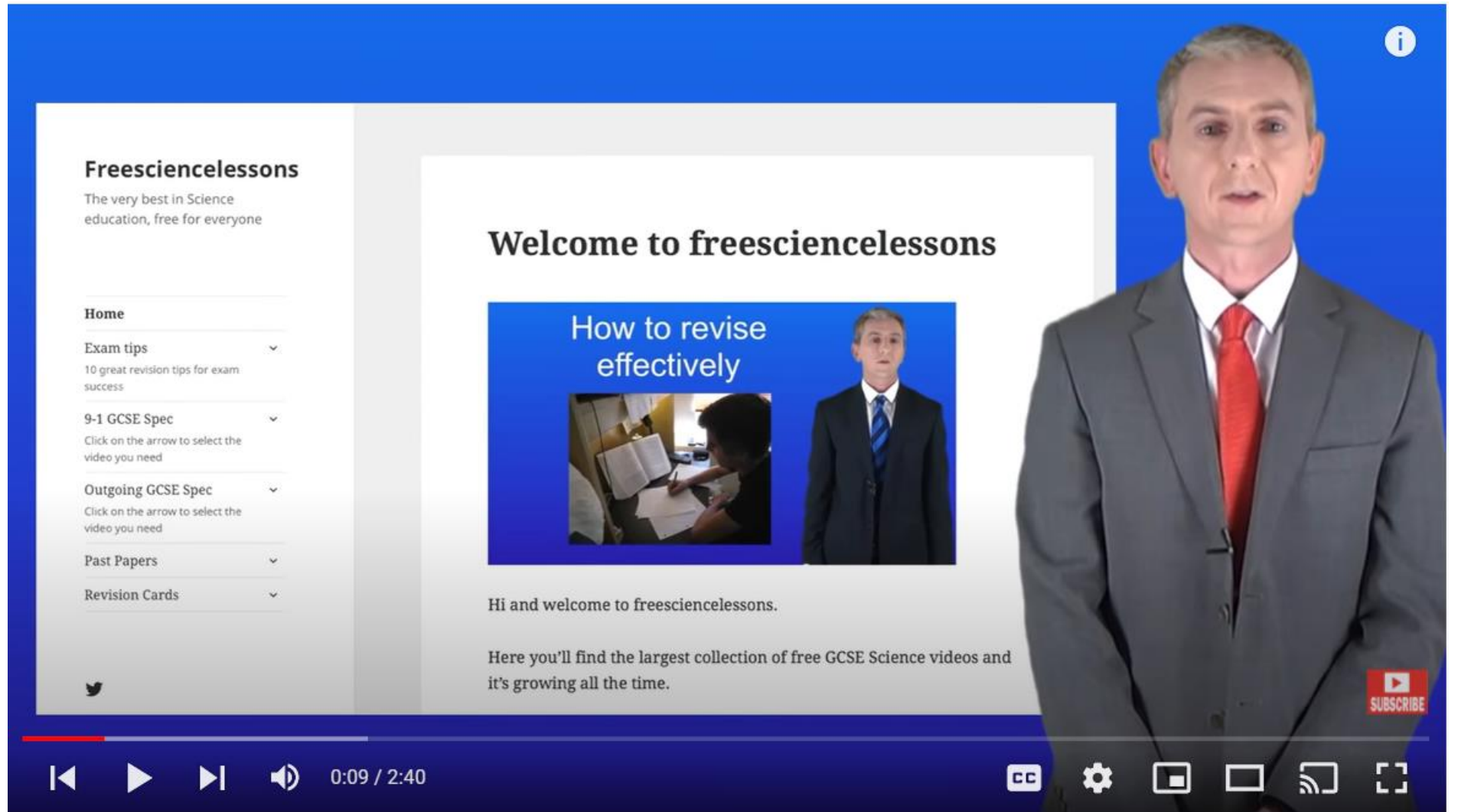


EXCELLENCE








ACHIEVE






**Freesciencelessons**  
The very best in Science education, free for everyone

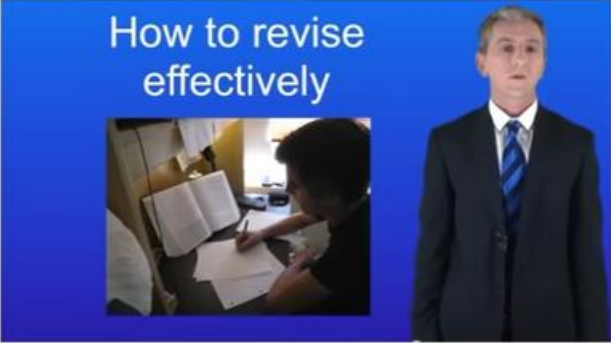
**Home**

- Exam tips   
10 great revision tips for exam success
- 9-1 GCSE Spec   
Click on the arrow to select the video you need
- Outgoing GCSE Spec   
Click on the arrow to select the video you need
- Past Papers 
- Revision Cards 




## Welcome to freesciencelessons

**How to revise effectively**




Hi and welcome to freesciencelessons.

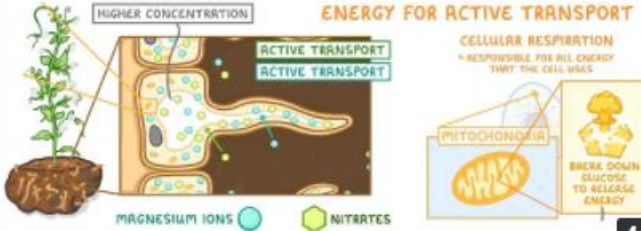
Here you'll find the largest collection of free GCSE Science videos and it's growing all the time.



0:09 / 2:40



## ACTIVE TRANSPORT



**HIGHER CONCENTRATION**

**ENERGY FOR ACTIVE TRANSPORT**

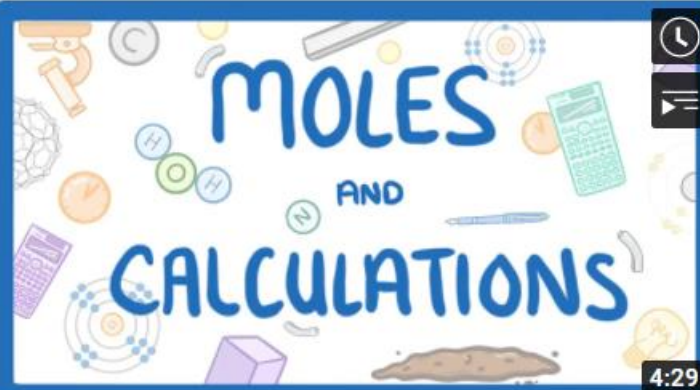
**CELLULAR RESPIRATION**  
~ RESPONSIBLE FOR ALL ENERGY THAT THE CELL USES

**MITOCHONDRIA**  
BREAKS DOWN SUCROSE TO RELEASE ENERGY

**MAGNESIUM IONS**   **NITRATES**

**4:48**

## MOLES AND CALCULATIONS



**4:29**

## ENERGY STORES AND SYSTEMS



**5:10**



[WWW.COGNITOEDU.ORG](http://WWW.COGNITOEDU.ORG)

### CORROSION

HOW WE CAN PREVENT IRON FROM RUSTING


**ANODE METHODS:**  
LEAVING OXYGEN AND WATER IN TOUCHING THE IRON

**SACRIFICIAL METHODS:**  
ADDING A MORE REACTIVE METAL TO THE IRON

**AN EXAMPLE THAT USES BOTH METHODS:**  
"GALVANISING"  
COATING THE OBJECT IN A LAYER OF ZINC

**THE BRANER METHOD**  
(FORMING A PROTECTIVE COATING)

**ZINC GETS SCRATCHED**  
IRON GETS EXPOSED



### Topic 2 - Organisation

- 2.1 - Cell organisation: tissues, organs and systems
- 2.2 - What are enzymes
- 2.3 - Things that affect enzyme action
- 2.4 - Digestive Enzymes
- 2.5 - Digestive System
- 2.6 - Food Tests (Phenolphthalein)
- 2.7 - Large & Gas Exchange
- 2.8 - Circulatory System 1 - Heart
- 2.9 - Circulatory System 2 - Blood Vessels
- 2.10 - Circulatory System 3 - Blood
- 2.11 - Cardiovascular Disease
- 2.12 - Health and Disease
- 2.13 - Risk Factors for Non-Communicable Diseases
- 2.14 - Cancer
- 2.15 - Plant Cell Organisation
- 2.16 - Transpiration & Translocation

LEARN      PRACTISE

SUB

0:02 / 8:44



Prokaryotic cells do not have a defined, membrane-bound nucleus like Eukaryotic cells.

## Stage 2

Make revision cards with a question on one side and the answer on the other /or lists of questions and answers

This is where parents/carers can get involved in testing.





MEDEN  
SCHOOL

Stage Three:  
Testing

This is the most  
important stage.

### Atoms, Elements and Compounds (p.12-15)

- 1) Sketch an atom. Label the nucleus and the electrons.
- 2) What is the charge of a proton?
- 3) True or False? Elements contain more than one type of atom.
- 4) Give the formula for:  
a) Carbon dioxide      b) Sodium carbonate
- 5) Balance these equations:  
a)  $\text{Mg} + \text{O}_2 \rightarrow \text{MgO}$       b)  $\text{H}_2\text{SO}_4 + \text{NaOH} \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$

### Mixtures and Separation (p.16-18)

- 6) What is the difference between a compound and a mixture?
- 7) What is the name of the pattern formed from carrying out paper chromatography?
- 8) Which method of separation is useful to separate an insoluble solid from a liquid?
- 9) Give the name of a method to separate a soluble solid from a liquid.
- 10) Which method of distillation would you use to separate liquids with similar boiling points?

### Electronic Structure and the History of the Periodic Table (p.19-22)

- 11) Who discovered that the plum pudding model was wrong?
- 12) Who first devised an experiment that proved the existence of the neutron?
- 13) What is the electronic structure of sodium?
- 14) Why did Mendeleev leave gaps in his Table of Elements?

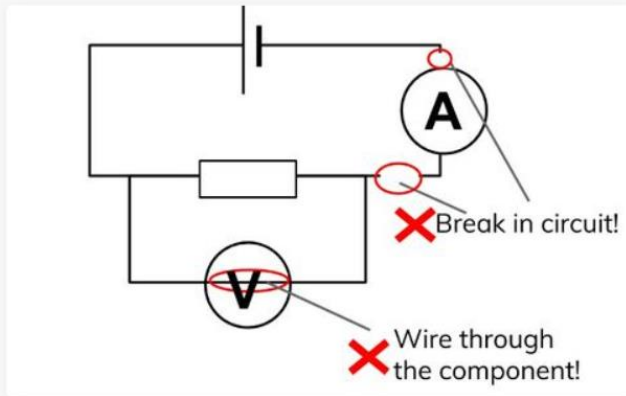


# Seneca and GCSEpod provide online revision with supported testing and instant feedback

This is a teacher preview that shows all possible questions. Our learning algorithm will adapt to show each of your students the best questions for them.

[Try as a student](#)

## Circuit Diagram Mistakes



- The diagram above shows some common mistakes made when drawing circuits.
- Make sure:
  - There are no breaks in the lines that you use to represent wires.
  - The wires don't pass through the components.

Feedback?

Which of these is a mistake in a circuit diagram?

0 / 1

## Group 1: Alkali Metals

### ION FORMATION

Sodium atom

loses an electron

Na

→

Na<sup>+</sup>

+

e<sup>-</sup>

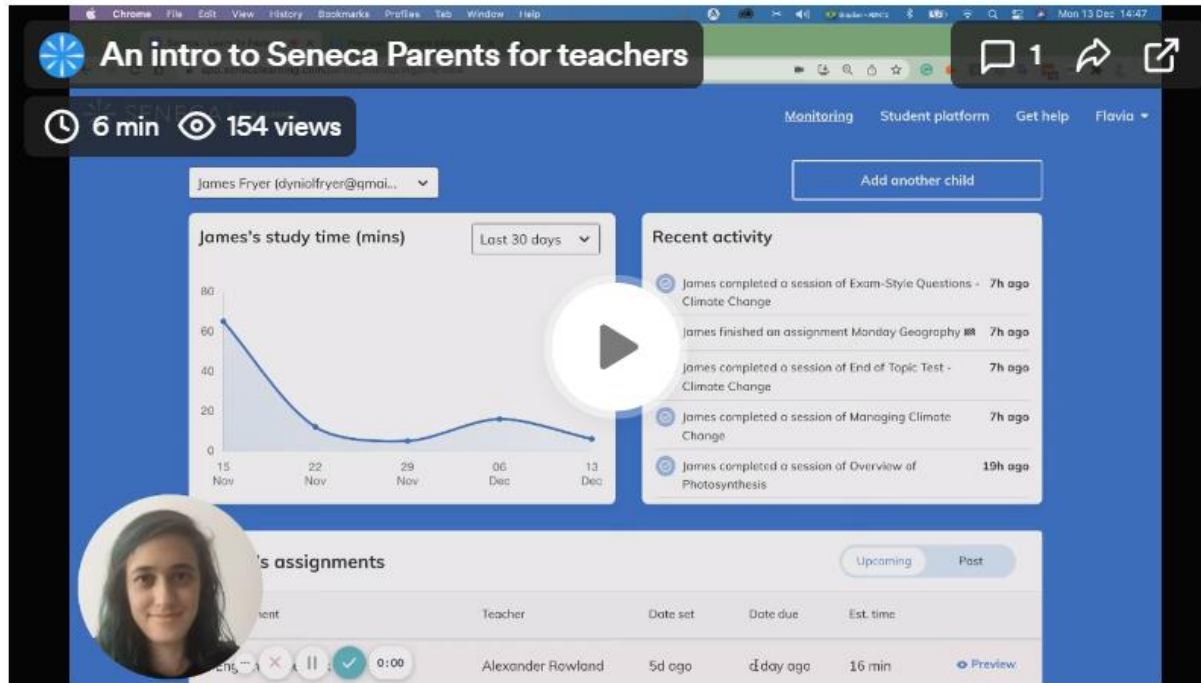
# How can the parent platform help teachers?

Our parent platform is free to use and lets parents keep up to date with how their child's using Seneca



Written by Flavia Belham

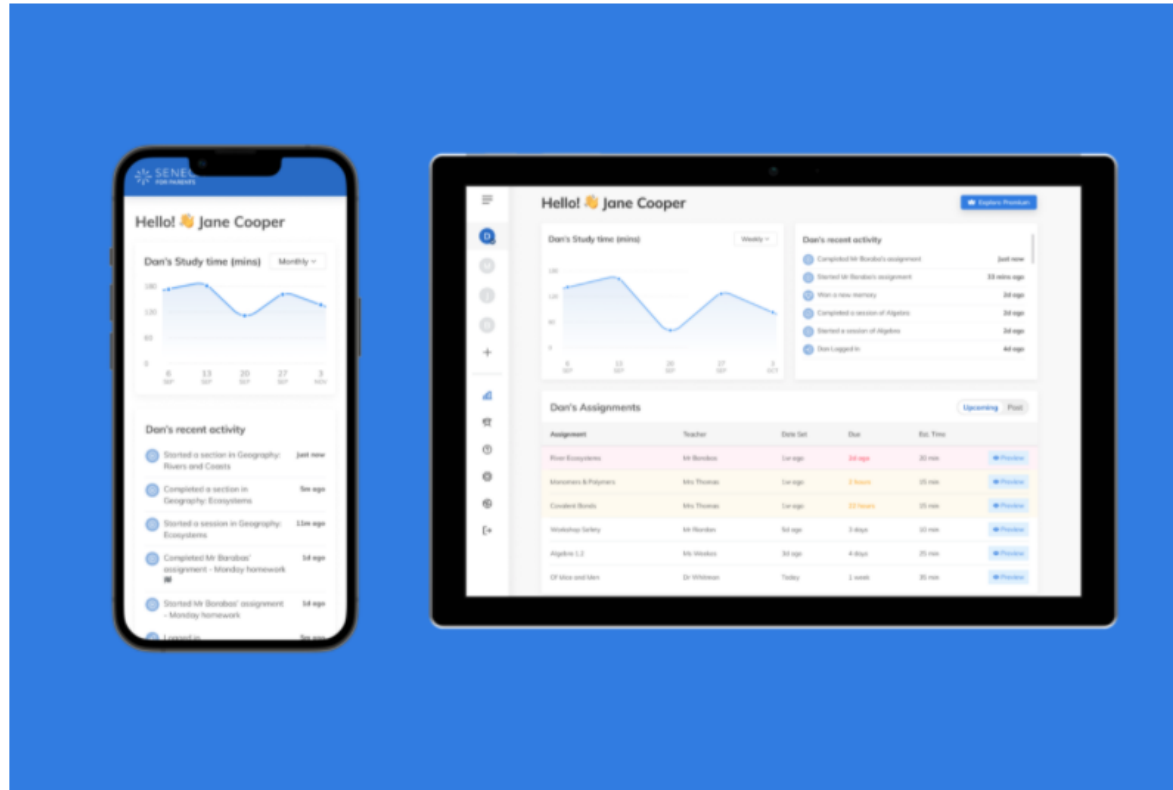
Updated over a week ago



The screenshot shows a video player interface for a video titled "An intro to Seneca Parents for teachers". The video is 6 minutes long and has 154 views. The dashboard displayed in the video is for a student named James Fryer (dynciofryer@gmail...). It features a line graph titled "James's study time (mins)" for the last 30 days, showing a decrease from approximately 65 minutes on Nov 15 to about 10 minutes on Dec 13. A "Recent activity" list shows several completed sessions, including Exam-Style Questions, Monday Geography, End of Topic Test, Managing Climate Change, and Overview of Photosynthesis. At the bottom, there is a table for "James's assignments" with columns for assignment name, teacher, date set, date due, and estimated time. A video player control bar is visible at the bottom of the screenshot, showing a play button and a 0:00 duration.

Assignment	Teacher	Date set	Date due	Est. time
...	Alexander Rowland	5d ago	1 day ago	16 min

Parents can connect to their child's Seneca account and check in on their recent activity, study time and **preview any assignments teachers have set.**



The assignments section allows parents to quickly check when homework is due. Any that are overdue are highlighted red, and yellow if they're due tomorrow. Parents can also see their child's scores on their completed assignments.



# CGP Workbooks

Students who own the science workbooks have been given them to use at home, as they are no longer needed in the intervention lessons.

Students should work through these at home towards the end of the revision process.

They are perfect for identifying gaps in knowledge.





**The final stage is trying exam questions.**

**These need to be attempted in exam style conditions.**

**We will be providing exam packs for the Easter holiday.**