Slide 1

The Ladies' College
Guernsey

Understanding memory

Chris Roughsedge
Deputy Principal (Teaching and Learning)

Slide 2

'If nothing has changed in long-term memory, nothing has been learned.'

Kirschner, P.A., Sweller, J., & Clark, R.E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist, 41*(2), 75-86.

Slide 3

Memory

- Memory is not a library, stored away neatly in organised sections.

- Memory is not objective.

- Memory is reconstructive.

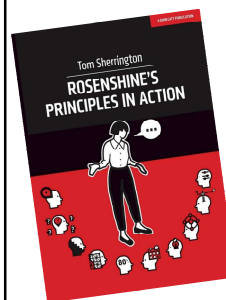## Slide 4

Multi-store model of memory

Slide 5
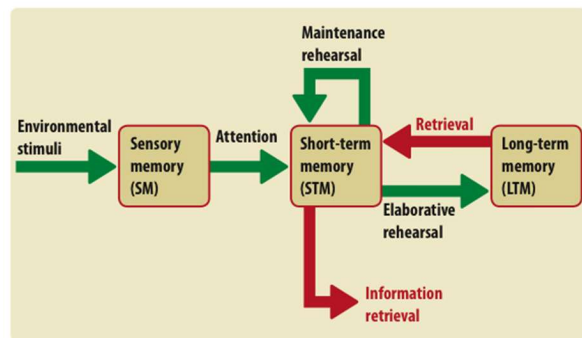
STM/Working memory Vs long-term memory

- Environment

- Working memory – limited capacity (5-9 things at one time)

- Long term memory – effectively infinite

Model of the mind, from Daniel T. Willingham, *Why Don't Students Like School?*

Slide 6
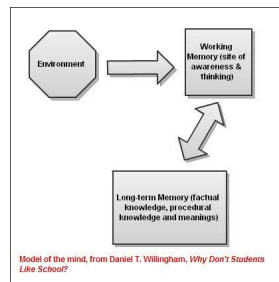
Evidence informed Teaching and Learning

Tom Sherrington
ROSENSHINE'S PRINCIPLES IN ACTION

Focuses on aspects of teaching that are relevant to all, regardless of subject:

- Sequencing concepts and modelling
- Questioning
- Reviewing material
- Stages of practice

Evidence informed Learning

- Listen to music when working?
- Have your phone out when you are working?

Evidence informed Learning

THE MAIN FINDINGS

1 Students who revised in **quiet environments performed over 60% better** in an exam than their peers who revised listening to music that had lyrics.

2 Students who revised whilst **listening to music without lyrics did better** than those who had revised to music with lyrics.

3 It made no difference if students revised listening to songs they **liked or didn't like**. Both led to **a reduction in their subsequent** test performance.

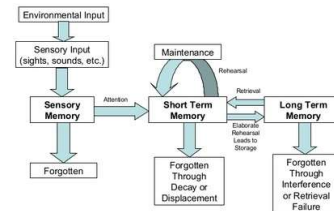## Evidence informed Learning

Twitter Instagram
Snapchat Facebook
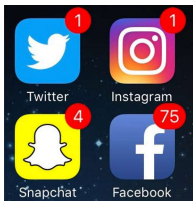
Lowers concentration

Having your phone out while doing homework or revision has been shown to reduce performance by 20%

Memory

- Forgetting – the inability to retrieve information after it was once learned (retrieval failure)

- Forgetting starts immediately after encoding.

Ebbinghaus Forgetting Curve (1885)

First Learned   Reviewed
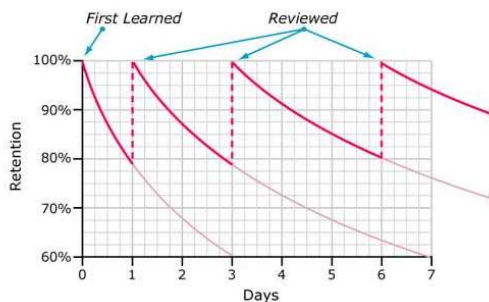
How many of you…..?

- Revise a little bit every day?
- Cram all your revision into the night before
- Re-read information lots of times.
- Read through your notes and highlight key words and detail.
- Have a blank sheet of paper and write down as much as you remember about a topic.
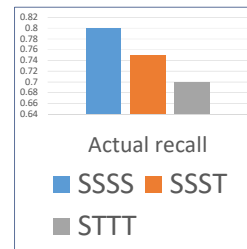- Use kahoot or quizlet to self-test at home.

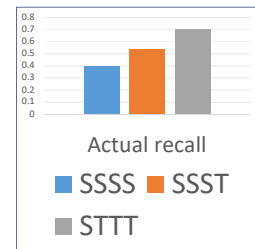**Independent learning**

Judgment of learning
■ SSSS ■ SSST
■ STTT
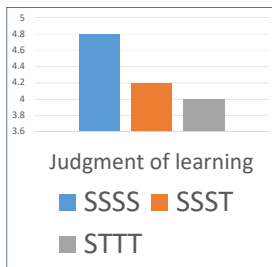
Roediger and Karpicke (2006)

- SSSS: Study, study, study, study
- SSST: Study, study, study, test
- STTT: Study, test, test, test

Independent learning

Actual recall
■ SSSS ■ SSST
■ STTT

5 minutes later

Actual recall
■ SSSS ■ SSST
■ STTT

1 week later

Effectiveness of specific learning techniques

High utility	1	Retrieval practice (practice testing)
	2	Distributed ('spaced') practice
	3	Elaborative interrogation
	4	Self-explanation
	5	Interleaved practice
Moderate utility	6	Summarisation
	7	Highlighting
	8	Keyword mnemonic
	9	Attempting to form mental images of text materials while reading or listening.
Low utility	10	Re-reading

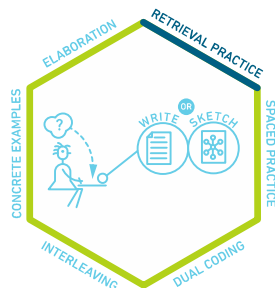EEF: Metacognition and self-regulated learning guidance report, 2018

Desirable difficulties

- The tasks that might make us feel that we are making the most progress often have the least impact on long term learning.

- The tasks that make us feel we are making the least progress can often have the biggest impact.

Retrieval Practice

Retrieval practice

- The act of trying to recall information without having it in front of you.

- Need to encounter a new concept on at least 3 separate occasions to learn it properly.

- Helps create coherent and integrated mental representations of complex concepts, the kind of deep learning necessary to solve new problems and draw new inferences.

3

Retrieval Practice

HOW TO DO IT

Put away your class materials, and write or sketch everything you know. Be as thorough as possible. Then, check your class materials for accuracy and important points you missed.

Retrieval Practice

HOW TO DO IT

Take as many practice tests as you can get your hands on. If you don't have ready-made tests, try making your own and trading with a friend who has done the same.

Retrieval Practice

HOW TO DO IT

You can also make flashcards. Just make sure you practice recalling the information on them, and go beyond definitions by thinking of links between ideas.

Retrieval Practice

HOLD ON!

Retrieval is hard! If you're struggling, identify the things you've missed from your class materials, and work your way up to recalling it on your own with the class materials closed.

Retrieval Practice

HOLD ON!

Don't only recall words and definitions. Make sure to recall main ideas, how things are related or different from one another, and new examples.
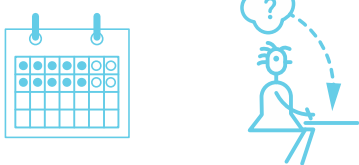
Spaced Practice

LEARN TO STUDY USING...
SPACE OUT YOUR PRACTICE OVER TIME

ELABORATION   RETRIEVAL PRACTICE

CONCRETE EXAMPLES

SPACING
2
TESTING   1   3   SKETCHING

SPACED PRACTICE

INTERLEAVING   DUAL CODING

Spaced Practice

HOW TO DO IT

Start planning early for exams, and set aside a little bit of time every day. Five hours spread out over two weeks is better than the same five hours all at once.
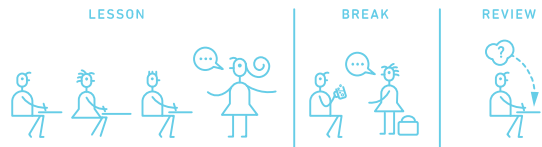
M T W Th F Sa Su M T W Th F Sa Su

Spaced Practice

HOW TO DO IT

Review information from each class, but not immediately after class.

LESSON   BREAK   REVIEW

Spaced Practice

HOW TO DO IT

After you review information from the most recent class, make sure to go back and study important older information to keep it fresh.

1 MONTH AGO   1 WEEK AGO   1 DAY AGO

Spaced Practice

HOLD ON

When you sit down to study, make sure you are using effective study strategies rather than just re-reading your class notes.

TESTING ①   ② SPACING   ③ SKETCHING

Spaced Practice

HOLD ON

This may seem difficult and you may forget some information from day to day, but this is actually a good thing! This forces you to retrieve information from memory.

LEARN TO STUDY USING...
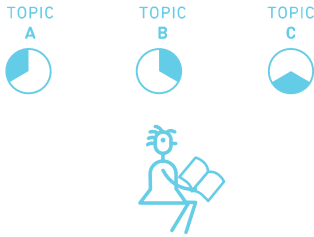## Interleaving
SWITCH BETWEEN IDEAS WHILE YOU STUDY

ELABORATION   RETRIEVAL PRACTICE
CONCRETE EXAMPLES   SPACED PRACTICE
INTERLEAVING   DUAL CODING

ACB CBA BCA
TOPICS

Interleaving

HOW TO DO IT

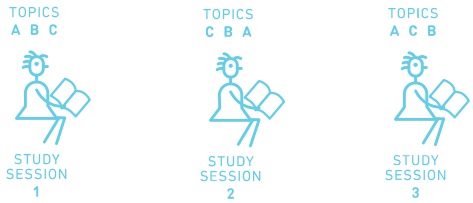Switch between ideas during a study session. Don't study one idea for too long.

TOPIC A   TOPIC B   TOPIC C

Interleaving

HOW TO DO IT

Go back over the ideas again in different orders to strengthen your understanding.

TOPICS A B C   TOPICS C B A   TOPICS A C B

STUDY SESSION 1   STUDY SESSION 2   STUDY SESSION 3

Interleaving

HOW TO DO IT

Make links between different ideas as you switch between them.

Interleaving

HOLD ON!

While it's good to switch between ideas, don't switch too often, or spend too little time on any one idea; you need to make sure you understand them.
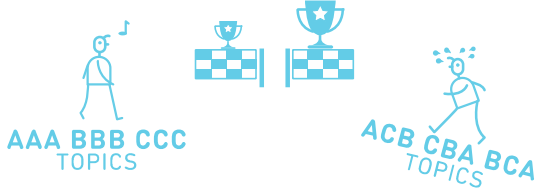
TOPIC A   TOPIC B

Interleaving

HOLD ON!

Interleaving will feel harder than studying the same thing for a long time. But don't worry - this is actually helpful to your learning!

AAA BBB CCC TOPICS

ACB CBA BCA TOPICS

Elaborative interrogation

- Asking and explaining why and how things work (and then answering them!).

- Understanding is enhanced when students elaborate a memory by adding details to it and integrating it with existing knowledge.

Dual coding

- Combining words with visuals.

- Providing both verbal and pictorial representations of the same information enhances learning and memory.

The Learning Scientists

http://www.learningscientists.org/

Avoid illusions of knowledge!

- Avoid being distracted by too many extraneous components. Memory is the residue of thought!

- Factor in cognitive load: small steps, chunking, interleaving etc

- Consider the strategies that help ensure learning stays in long-term memory.

Familiarity is not mastery!

Multi-tasking is a myth!

Multi-tasking causes a **40%** decline in productivity.

People make twice as many errors when they multi-task.

Multi-tasking leads to a **20%** decrease in cognitive abilities.

People often think they are better than they are. **70%** of people believe they are above average at multi-tasking!

The Ladies' College
Guernsey

Effective Revision

Dave Herschel
Learning Support Teacher

When should revision begin?

When should revision begin?

- What is revision?
- What do pupils need to do before they can start revising?

When are the exams?

When are the exams?

This summer's main exam season starts in 77 days. There are 42 school days, and 35 non-school days.

How much revision is enough?

How many hours should be spent revising:
- On a school day?
- On a study leave/weekend/holiday day?

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Is there such a thing as too much revision?

Why is it important to plan revision?

Why is it important to plan revision?

- To ensure that the task is spread effectively over the time available.

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- To ensure that the task is spread effectively over the time available.
- To achieve a balance between study and other essential activities.

Why is it important to plan revision?

- To ensure that the task is spread effectively over the time available.
- To achieve a balance between study and other essential activities.
- To reduce stress.

Planning Revision

1. Make a list of all subjects
2. Use the subject specifications to list the topics/units within each subject
3. Rate each topic within each subject in terms of amount of revision needed to feel exam ready
4. Start with the beastly ones! Transfer them to a revision timetable
5. Tick off/keep a tally once revision has been undertaken for a given topic

How long should revision sessions be?

How long should revision sessions be?

The effect of all of this is that a boy who plays these types of games will find his brain giving much higher priority than it should to remembering these gaming "skills" when forming memories during sleep. Whilst asleep following a long session of gaming, during which many new techniques may have been learnt, the brain may simply decide that there is no room for remembering the Latin verbs or chemical equations from earlier on in the day.

This prioritising of gaming "skills" within the sleeping brain can result in a huge desire to play again on waking. The way games are designed encourages boys to keep playing for many hours in some cases, and the ability to play against friends online increases this temptation still further. Computer game designers know this, and it makes great financial sense for them to exploit these addictive properties, of which they are surely well aware.

Towards the end of a good night's sleep, the brain releases proteins which help to "re-wire" the brain for the next day, as well as cortisol, which brings about a feeling of alertness. If boys lose sleep because they staying up to play longer, or cannot sleep after playing games, this process will not be completed and they will be tired and irritable in the morning.

Another concern is the effect on the brain of light from a screen, later in the day. The feeling of sleepiness is triggered by the release of melatonin from the pineal gland. This hormone starts to be released about 12 hours after the mid-point of our night's sleep, which explains why many of us experience a period of tiredness in the early afternoon. Melatonin gradually builds up during the afternoon and evening, until it eventually sends us off to sleep. The pineal gland is very sensitive to light and so working or playing on a computer, or sitting too close to any screen late at night, can delay the onset of sleepiness, resulting in insomnia and lack of sleep.

It seems that boys are spending more and more time playing video games as time goes on. If parents are concerned about their sons' performance at school, it is essential that they are aware of how boys spend their leisure time, and that they arm themselves with the information they need to facilitate any adjustments which may become necessary. Any parents requiring help with tackling this issue at home are strongly encouraged to contact their son's Head of Year.

useful to know); pupils who attach value to their learning are far more likely to remember it whereas those who are constantly questioning its value will find this more difficult. For learning in a field of understanding that is new to us, for example a new topic in a subject at school, this whole process will take several weeks of healthy sleep to be fully completed. Many computer games simulate situations which test survival skills, especially shooting or fighting games. Whilst absorbed in such a game, the teenager's brain is fairly easily fooled into believing that it is engaged in a fight for survival. This is because the part of the brain associated with primal instincts, the amygdala, becomes extremely large during puberty, and takes over many decision-making processes whilst the frontal cortex is re-configured for adulthood. (This is why teenagers so often act impulsively, and then immediately wonder why.) Computer games trigger a far more emotional response in the brain than most lessons can ever hope to achieve. No matter how wonderful a teacher is, or how much flashy technology they use, it is impossible to compete for memory space with the bright colours, loud noises and kinaesthetic engagement of playing a game. The effect of all of this is that a boy who plays these types of games will find his brain giving much higher priority than it should to remembering these gaming "skills" when forming memories during sleep. Whilst asleep following a long session of gaming, during which many new techniques may have been learnt, the brain may simply decide that there is no room for remembering the Latin verbs or chemical equations from earlier on in the day. This prioritising of gaming "skills" within the sleeping brain can result in a huge desire to play again on waking. The way games are designed encourages boys to keep playing for many hours in some cases, and the ability to play against friends online increases this temptation still further. Computer game designers know this, and it makes great financial sense for them to exploit these addictive properties, of which they are surely well aware. Towards the end of a good night's sleep, the brain releases proteins which help to "re-wire" the brain for the next day, as well as cortisol, which brings about a feeling of alertness. If boys lose sleep because they staying up to play longer, or cannot sleep after playing games, this process will not be completed and they will be tired and irritable in the morning. Another concern is the effect on the brain of light from a screen, later in the day. The feeling of sleepiness is triggered by the release of melatonin from the pineal gland. This hormone starts to be released about 12 hours after the mid-point of our night's sleep, which explains why many of us experience a period of tiredness in the early afternoon. Melatonin gradually builds up during the afternoon and evening, until it eventually sends us off to sleep. The pineal gland is very sensitive to light and so working or playing on a computer, or sitting too close to any screen late at night, can delay the onset of sleepiness, resulting in insomnia and lack of sleep. It seems that boys are spending more and more time playing video games as time goes on. If parents are concerned about their sons' performance at school, it is essential that they are aware of how boys spend their leisure time, and that they arm themselves with the information they need to facilitate any adjustments which may become necessary. Any parents requiring help with tackling this issue at home are strongly encouraged to contact their son's Head of Year.

Suggested structure for study on a non-school day:

am 1	30mins	(5mins)	30mins	Subj 1
	20 minute break			
am 2	30mins	(5mins)	30mins	Subj 2
	LONG break			
pm	30mins (5mins) 30mins (5mins) 30mins			Subj 3
	break			
eve	"Bonus" time			Subj 1/2/3

Planning Summary

- Plan your revision in as much detail as you can before you start.
- Be topic-specific.
- Plan to do most "hardcore revision" in the mornings.
- Stick to the structure of 30 minute blocks with short breaks and longer breaks alternating.

What does effective
revision look like?

Reading

Reading
Writing Key Points

Reading
Writing Key Points
PROCESSING

Reading
Writing Key Points
PROCESSING
VOCALISATION

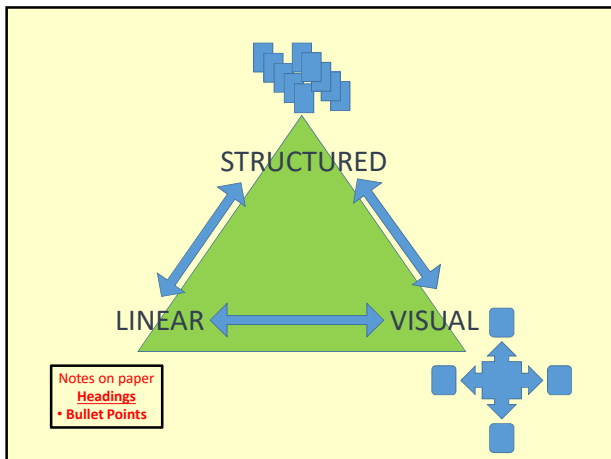Revision: Methods for making notes

Not everyone will use the same style of notes.

Most common types are:

• flash cards
• linear notes
• mind maps

Whatever the style, maximise effectiveness by:

• using headings and sub-headings
• using colour
• including pictures, symbols and diagrams

Slide 1

STRUCTURED

LINEAR ⟷ VISUAL

Notes on paper
Headings
• **Bullet Points**

Slide 2

Revision: Assimilation

What we spend our time deeply thinking about, is what will be committed to memory.

Re-reading just creates the 'illusion of knowledge'.
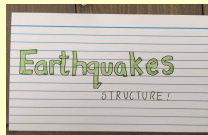
'Rehearse' information OUT LOUD
Move around while doing it
Add movements where appropriate
Use silly voices or accents for tricky info
Get someone to test you

Slide 3

FLASH CARDS

Definition/key word/process/term on front

Information/explanation/diagram/answer on back
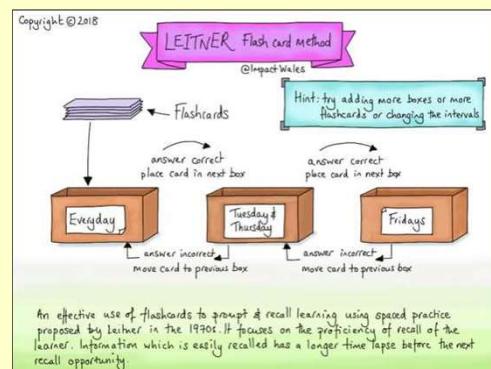
Slide 4

FLASH CARDS

Ensure the cards have a title card and the topic/unit is written somewhere on the front of each card

Colour code subjects/topics

Slide 5

Reading
Writing Key Points
PROCESSING
VOCALISATION

Slide 6

Flashcards

An effective use of flashcards to prompt & recall learning using spaced practice proposed by Leitner in the 1970s. It focuses on the proficiency of recall of the learner. Information which is easily recalled has a longer time lapse before the next recall opportunity.

Memory Strategies

- The "Magic Hand"
- The Number Rhyme Method
- Sensory Integration
- **Spatial Method**

WHERE SHOULD YOU REVISE?

No Distractions:

- Computer
- Mobile Phone
- Clock
- Music

Why sound of silence is best for homework- THE TIMES

Scientists found listening to music while working adversely affects concentration
Tom Whipple
Published January 9 2014

If you want to understand Emily Brontë's *Wuthering Heights*, it might be best to switch off Kate Bush's version. If you want to make progress with *The Pilgrim's Progress* , you'll find no assistance from Judas Priest. **Contrary to the insistence of every teenager, it seems that listening to music does NOT improve concentration.**


According to scientists it could actually hinder homework.
Researchers from Cardiff Metropolitan University gave 30 people a reading task. While they were studying the passages — about the silent film industry, genetics and journalism — they either listened to music they had chosen, thrash metal music (which, typically, they had not), music without any lyrics, or silence. Afterwards, they had to answer six multiple choice questions.
Scientists writing in the journal *Applied Cognitive Psychology*, found that all music was bad for performance but that music with lyrics was worst. The participants answered 60 per cent of questions right when they read in silence, about 50 per cent when they were listening to just music and 40 per cent to music with lyrics.
The authors said the act of filtering out lyrics meant that taking in written words was harder. So it seems teenagers doing their homework cannot apply their mind in two directions — particularly while listening to One Direction.

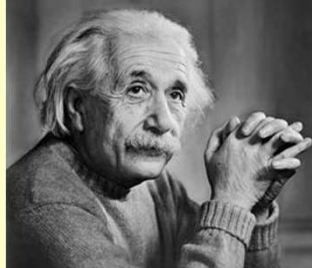**WHERE SHOULD YOU REVISE?**
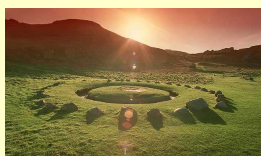
#icanprocrastinateforbritain

Use a timer for your breaks

I must begin revision.
I must begin revision.
I must begin revision.

It's stressful for parents too!
How else can parents help?

If you can't explain it **simply**, you don't understand it well enough.

– Albert Einstein

Swap roles: Parent becomes the learner

BE ENCOURAGING…..

But be careful how you 'encourage'!
Telling your daughter to revise may have the opposite of the desired effect!

You Rock!

Suggested alternatives:
'How's revision going?'
'What's on the revision plan for today?'
'Let me know if you need any help with your revision tonight'

The Telegraph

University candidates selected on their GCSE results

Pupils who fail to excel at their GCSEs are being discriminated against by universities increasingly using the exams to weed out candidates for degree courses, leading teachers have claimed.

A growing number of institutions are using the results that children achieve at 16 as a "crude preliminary filter" as competition for higher education places hits unprecedented levels.

Some leading **universities** now require students to score a string of A grades at 16 as a minimum entry requirement in addition to A-levels, research by *The Daily Telegraph* has found.

Teachers warned that the move risked punishing late bloomers and forcing children to make decisions about their career at the age of 13, when GCSE options are chosen.

But academics insisted that universities had to look beyond A-level results to pick out the best candidates from the record numbers applying for degree courses.

Martin Stephen, the High Master of St Paul's School, west London, said that some universities rejected students who failed to get a string of elite A*s at GCSE.

Ten pitfalls to look out for and avoid:

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1. "They're only GCSEs."

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9. "I'm going to Amelia's; we're revising together."

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8. "Listening to Justin Bieber helps me concentrate."
9. "I'm going to Amelia's; we're revising together."
10. "Playing Call of Duty/going on Instagram helps me relax."

Well-being

Eat, Sleep and Relax…

Food, glorious food!

Revision Snacks

- Nuts, seeds, high-fibre fruits, dried fruits
- https://www.bbc.com/food/collections/studying_survival_kit
- https://www.buzzfeed.com/ariellecalderon/healthy-power-snacks-to-eat-when-youre-studying

And to drink…?

Breakfast…

the most important meal of the day

Great Exam day Breakfasts!

And Rest…

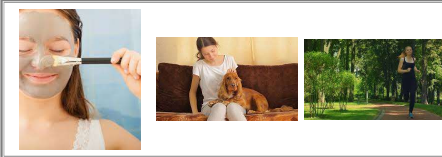- Students who have 7-8 hours of sleep do 10% better than those who have shorter or broken/ interrupted sleep.
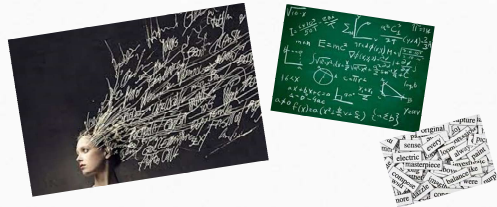

Add a little calm
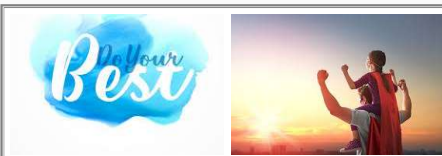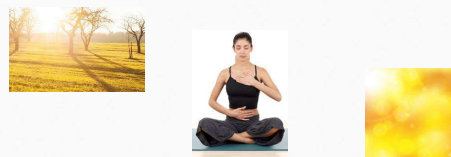
Screens giving you the blues?

Clear your mind

Well-being

Be good to yourself and take a break

Combat anxiety

Show 'em what you're made of!