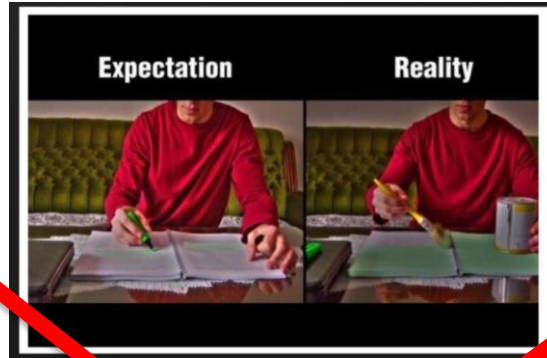


Ineffective study methods



Just reading notes



Just highlighting
notes



Long study periods



Just studying before an
exam/cramming

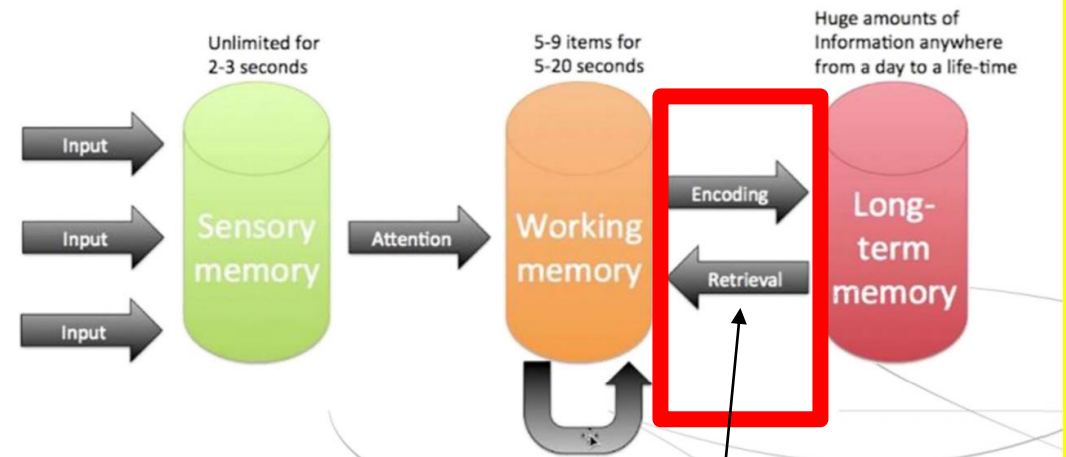
Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology

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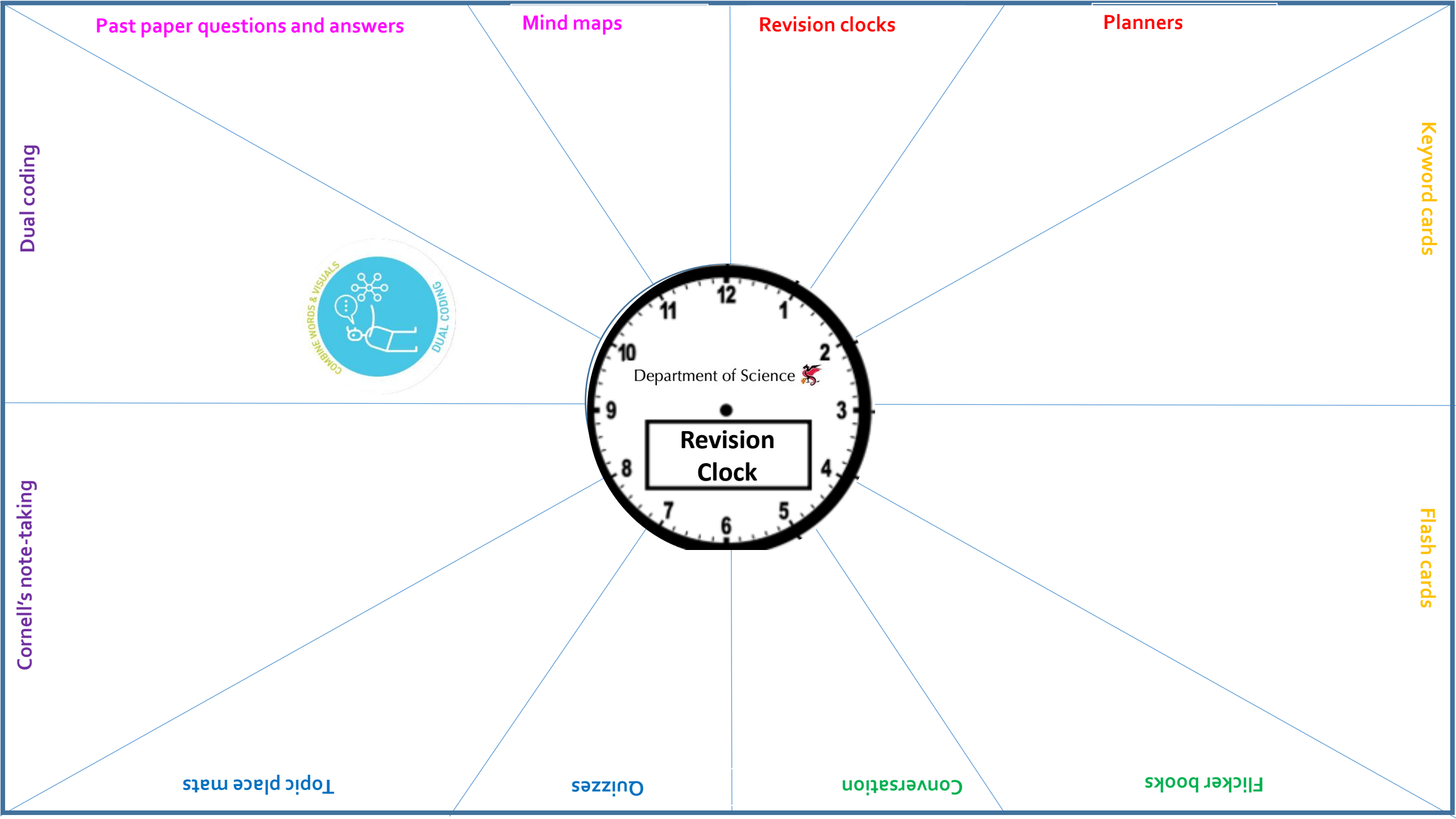


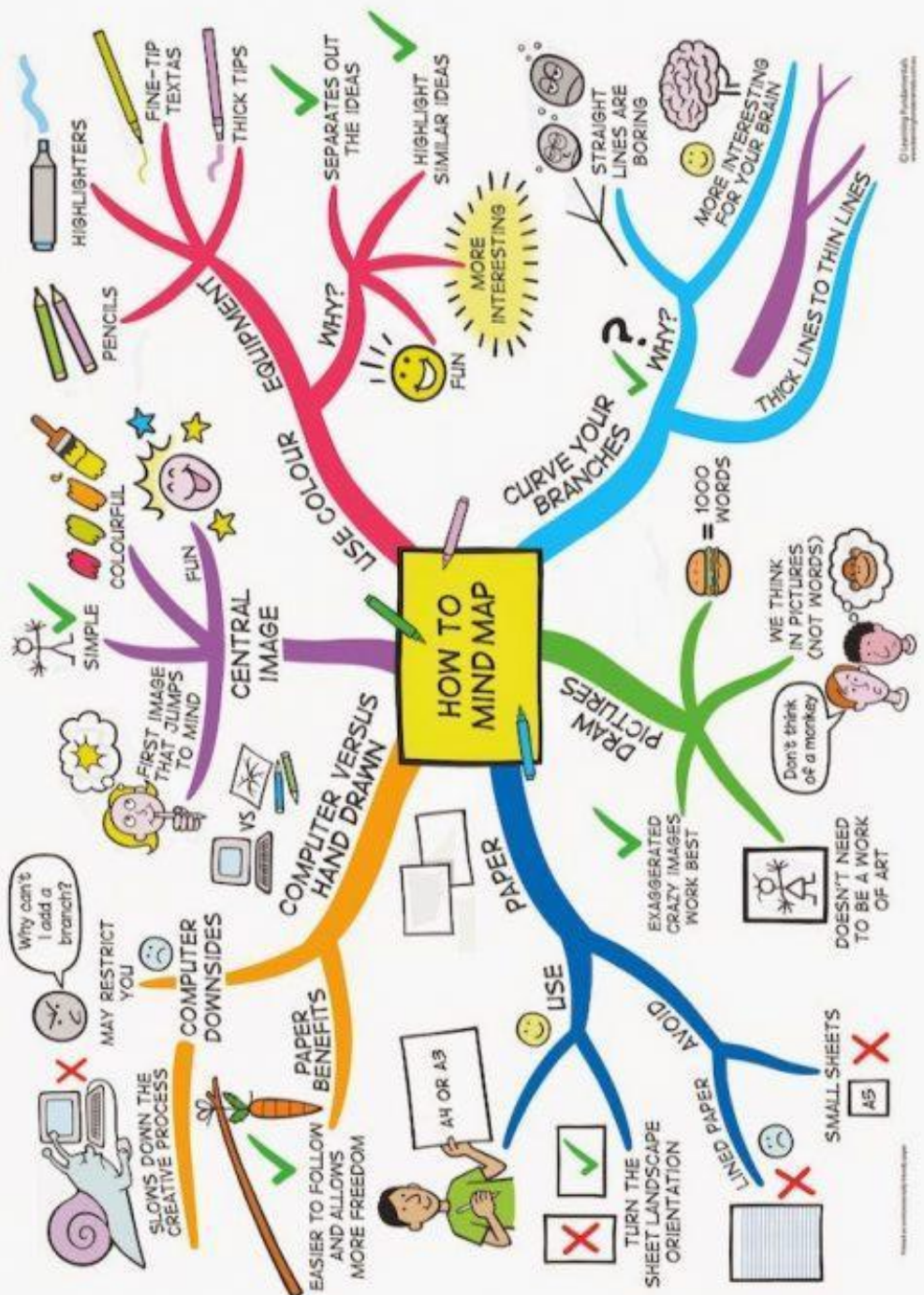
This is the bit we are trying to improve when we revise.

Putting information in long term memory **and then getting it back** again when it matters!!



<https://www.learningscientists.org/>





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Student Revision Toolbox

- Ideas for revising alone**
1. Dictate your notes into a recording device and listen to them
2. Write notes and diagrams on post-its and have them on something you see everyday
3. Mind map your topic
4. Memory challenge - look at the labelled version of a drawing or a piece of text for 30 seconds. Cover it up and try and draw or write what you saw. Compare the two pictures or notes.
5. Whatever you didn't include is what you need to revise more
6. Cheat Cards- PRETEND you can cheat by putting the key points of a topic on a scrap of paper you can hide in your pencil case. Limited space means you can only write the most important things (Don't use this in the real exam!)
7. Concept Map - Write key words onto A3 paper, link them with arrows, write over the arrows how the two words are linked
8. Invent a Mnemonic or Acrostic for remembering difficult concepts
9. Read the revision guide/your notes
10. Make bullet points from revision guide/ notes
11. Create an exam paper include questions and a mark scheme. If working with others, swap and answer. Then swap back and mark.
12. Draw diagrams/pictures from your notes
13. Write descriptions of diagrams
14. Answer questions from the revision guide

Ideas for revising with others

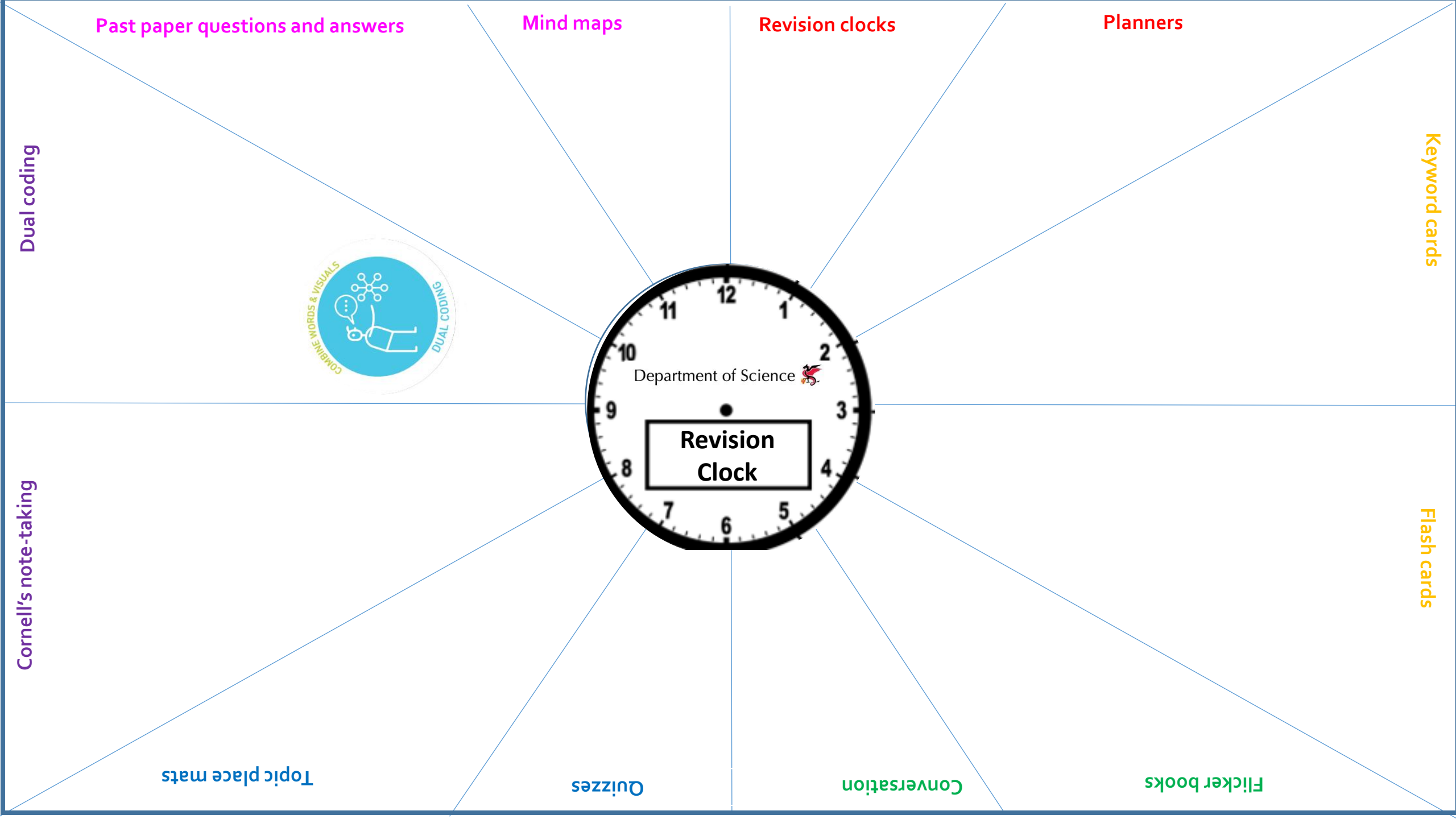
1. Put key words and definitions on to separate cards, turn them all over and mix them up. Then try to find the pairs by turning them over, if you get a pair you get another go. The person with the most pairs wins. Play a few times and keep adding more key words and definitions
2. Get pieces of A4 paper with key topics written on the top. Each person writes something about that topic on the paper and pass it to another. Keep passing the paper until it is full. Afterwards, check you understand everything on the paper, what you don't know you need to revise further.
3. Talk-Litren-repeat - Face a partner and talk on a subject for 30 seconds (they might want to write it down first). Now swap. Repeat trying to get more key words into the 30 seconds without looking at their notes.
4. Using the criteria, give an answer to a question that will give you an E. Next person moves this up to a D and so on... can you work as a team to push to the highest grades
5. Each person writes a list of 10 questions on the topics you find the hardest (include the answers) then ask you questions to each other and score each other.
6. Pictionary / speed Pictionary - draw pictures which represent key words, team members or partners guess what they are
7. Paper in a bucket - Write topic key words on scraps of paper, put them all in a bucket, each person picks one out and has to describe the key word without saying the word. Person with the most wins that round. Then put them all back. Round 2 - same thing but only say one or two words. Round 3 - same thing but act out the word

Ideas revising in class or in a group

1. Back 2 Back - One person describes what they can see on a diagram or picture on the topic, the other person can ask lots of questions but not look at the same thing. Student 2 draws what they think student one sees. When finished compare two pictures.
2. Risky/post-it note game (post it notes on forehead - students have to ask yes/no questions to work out what/who they are)
3. The big question. Write out about 5 questions. Split class into groups of 5 give each member of the group a different question, give the pupil 1 minute to read the question then one minute to write a response then tell them to swap papers and repeat, pupils read other pupils ideas (revision) and add their own. Mark them as a class and see which group got highest marks.
4. Pass the parcel: for the last lesson before they leave big pass the parcel revision, in each layer is a question - question has to be answered correctly for dilly prize.
5. Make Spider diagrams of a topic
6. Individual whiteboard quizzes
7. Jeopardy (give them the answers, they make the questions).
8. Pictionary with key words
9. Diamond 9 on suitable topics
10. Make snakes and ladders game - positive for ladders negative for snakes
11. Keywords and definitions to match (card sort)
12. Dominoes with questions and answers,
13. Keyword mind maps - link words with a statement
14. "Teach you/ the class" - pick mini topics, give them 20 minutes. You will be concentrating on the "facts" so other groups can report on the delivery, coverage etc (this focuses their attention and allows a bit of all).
15. Bingo with keywords
16. Flip chart paper with different topic titles - Each student/team gets different colour pen - all add what they know to each poster for 20 seconds then move to the next poster. Gets harder and harder the more you move around the room.
17. Speed dating - ten questions on a topic (e.g. a page in the revision guide) Table in a circle - half the pupils inside, half outside the circle. For 4.5 minutes the pupils ask each other their questions. At the end of the 4 minutes either the outside or inside pupils move round one seat and repeat the exercise. Repeat group learning. Split group up into 3s. Each group takes a poster to summarise on A3 paper. After only 20 minutes choose one person from each group to go to the next group (they are the LEARNER) and team about the topic they have summarised. The group have 5 minutes to teach the topic to the learner. After 5 minutes you liaise with the learner to find out what they have learned.
18. In pairs pupils make poster on double spread from textbook (15-20 mins) one becomes the expert. I rearranged desk into horseshoe shape. Expert explains points to student from another group. All rotate round so seen all posters then swap over. I found 40 sec was best for each one

Revision websites

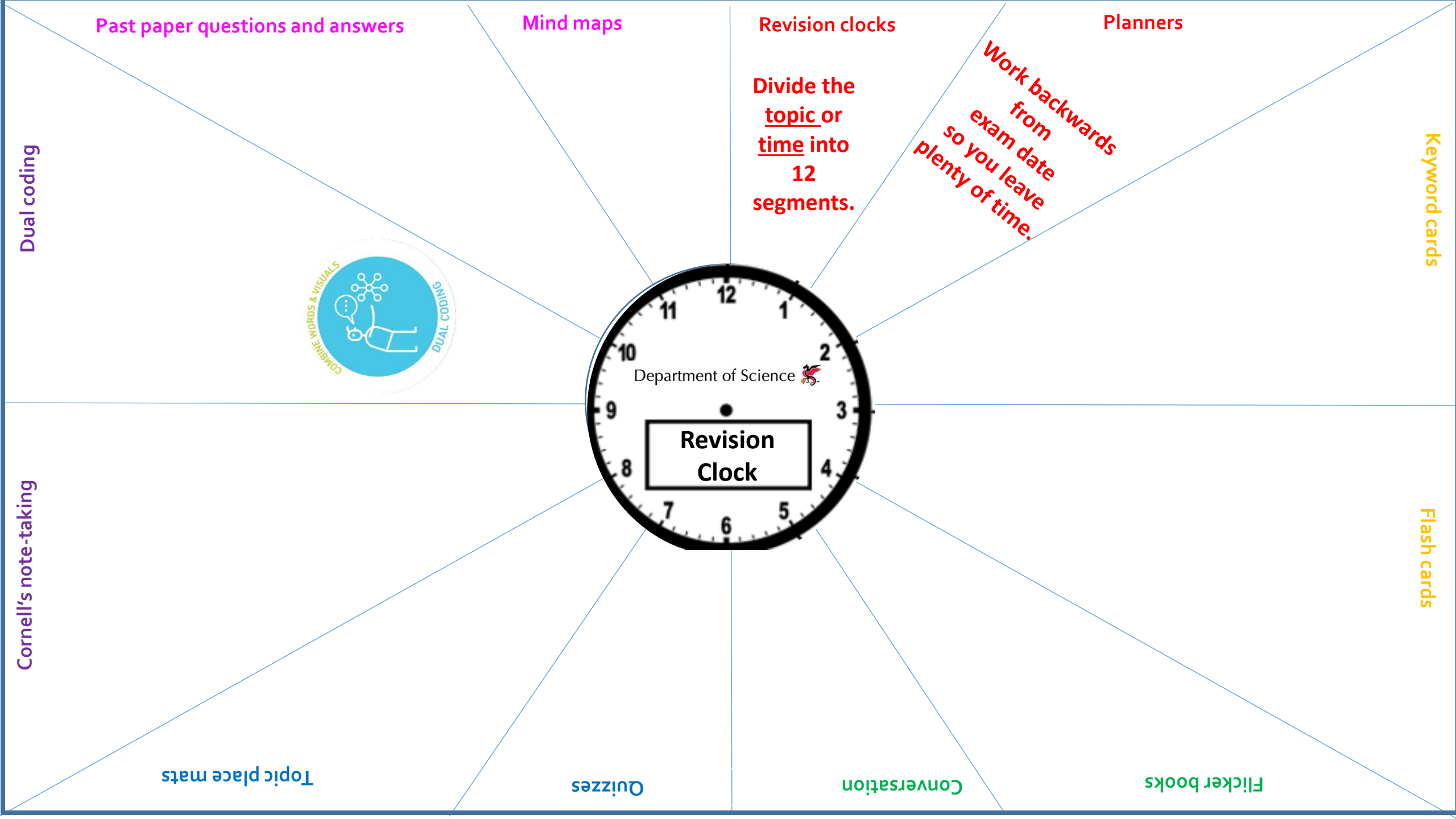
1. BBC Bitesize - bbc.co.uk/ck1000/bitesize
2. Yacarta - revision quizzes on all topics - <http://yacarta.com>
3. General revision topics - <http://www.revision.co.uk>
4. Revision guidance <http://www.revision.co.uk/revisionguidance>
5. Quizzes and games for most subjects at sheppardssoftware.com
6. Make a cartoon strip at makeacartoon.com/Comic
7. Make a mind map using "freemind"
8. http://freemind.sourceforge.net/wiki/index.php/Main_Page
9. Make a mind map online for other users to contribute to - bubbl.us/index
10. Make a speaking avatar talking about a topic yoki.com
11. Golden Rules/Things to keep in mind
12. Don't revise for long periods - Have a break. 20-40 minutes per topic at a time with a break in between might help.
13. Revise somewhere you won't be disturbed and it's easy to work. Bedroom/Public Library/School library/cafe (you might have to buy something to stay there)/Friends or relatives house/The bottom of the garden or A local park (if you have one and it is not raining)
14. Planning your revision
15. Make a revision diary A1D a planner - Planners can be ignored, but if you write down what you have done you know how much you have actually covered
16. Divide the number of topics you have to revise between the number of days you have left.
17. Draw the plan - one week per A4 sheet of paper.
18. On the plan enter the fixed events which you have to attend: e.g. birthday party, Youth Club, Saturday job etc.
19. Delete the remaining time into morning, afternoon, and evening sessions of about 3 hour each, e.g. 9-12 a.m.; 2-4 p.m.; 7-9 p.m.
20. On separate pieces of paper take each of your subjects and make a list of all the topics for each one.
21. On another piece of paper re-list the topics in order of difficulty - most difficult at the top.
22. On the plan enter 3 topics for each session, one from each subject, most difficult first.
23. Memory is about repetition - covering things once is not enough



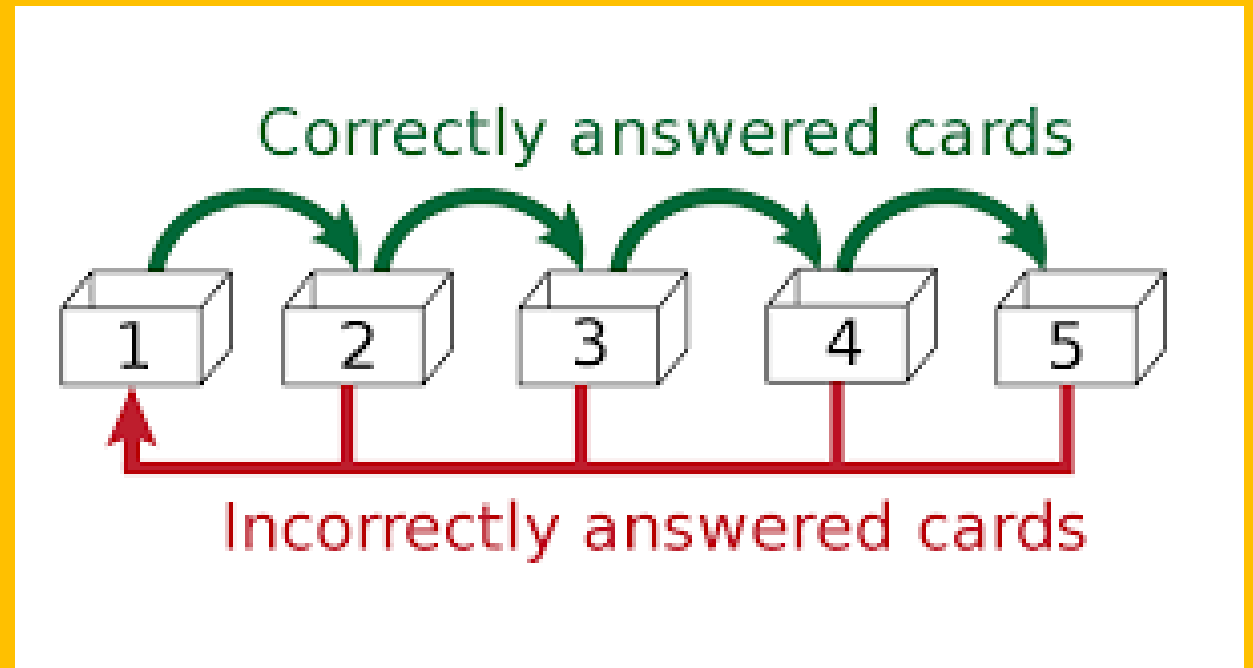
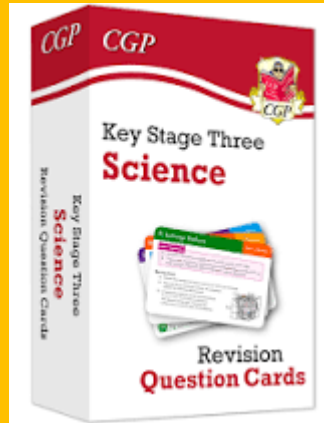
Time \ Day	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
9am							
10am							
11am							
12noon							
1pm							
2pm							
3pm							
4pm							
5pm							

10	Monday 9 th Nov		Tuesday 10 th Nov AcE Day		Wednesday 11 th Nov		Thursday 12 th Nov		Friday 13 th Nov	
Period 1 8.30-9.25				8.30 -9.40 Mock English 1hr ~Rm 27A			7.2a	Absorption	6K	Animal Vs Plant Cell onion slide
Period 2 9.30-10.25	8.1	Green plants and environment		9.45-10.50 Mock Maths Scholars 1hr ~Rm 28A						Science meeting
Break									7.2b	Absorption
Period 3 10.50-11.45	7.2a	Enzymes + temperature					5	Appraisal		
Period 4 11.50-12.45	7.2b	Enzymes + temperature					6A DR	Specialised cells		
Lunch		ECO						ECO		
Period 5 13.45-14.40		Remembrance service		13.50 – 14.10 Register? 8L Revision Plans – Lab 1 14.15 – 14.10 Register? 8L Revision Plans – Room 28 Break 14.35-14.50 Backfield Science Labs wet break			8.1	Assessment Waves/ Light/ Sound	8	
Period 6 14.45-15.40	6A	Cells lesson 1 TPR BOOK				Reports 6/7	6K 18L	Specialised cells		
	8: scholarship paper 7: enzymes graph									

WICM



Genotype	The combination of alleles which you carry for a particular gene	Dominant Allele	An allele which is always expressed when it is present.
Phenotype	Physical appearance	Recessive Allele	An allele which can be masked by another allele it is only expressed when two copies are present
Chromosome	Made up of many genes	Homozygous	If an individual has two copies of same allele of a gene the individual is...
Allele	Different versions of the same gene	Heterozygous	If an individual has two different alleles of a gene the individual is...
DNA	The chemical code that makes up your genes	Gene	A short section of DNA that tells a cell how to make one type of protein.



Keyword cards

Definitions are important
Understanding
is essential

Flash cards

Repetition
little and often

Flicker books

Conversation

Quizzes

Topic place mats

Cornell's note-taking

Dual coding

Planners

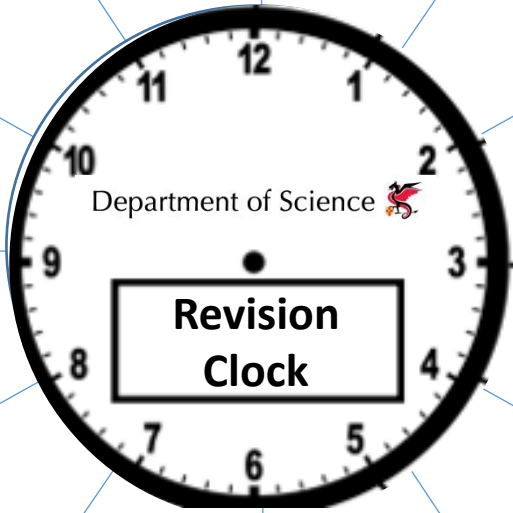
Work backwards
from
exam date
so you leave
plenty of time.

Revision clocks

Divide the
topic or
time into
12
segments.

Mind maps

Past paper questions and answers



Conversation Partner Talk

PARTNER ONE

1. What is digestion ?
2. What is an enzyme?
3. Name the route a piece of food takes in the body?
4. What happens in the large intestine?
5. What is starch?

PARTNER TWO

1. Why does food need to be digested?
2. List some examples of enzymes?
3. Name the 7 food nutrient groups
4. What happens in the small intestine?
5. Which enzyme breaks down starch?

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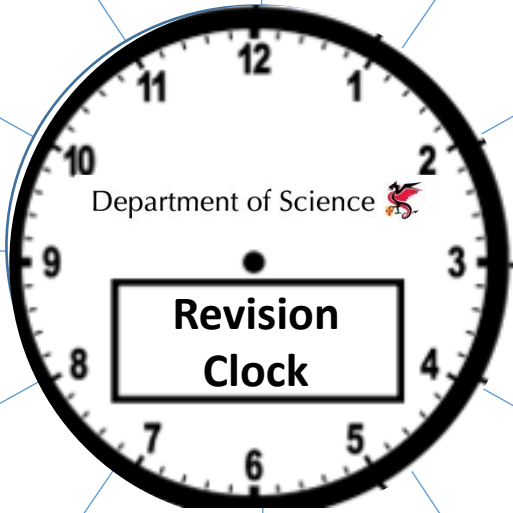
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Density

Which is more dense, oil or water?

What is volume?

Draw two squares of equal volume but a different density

What is density?

Draw particles of Solid, liquid and gas

How do you calculate the density of a liquid?

Draw two squares of different volume but the same density.

What is the formula for calculating density?

What is the equation for calculating volume of a regular shape?

Last lesson
1 point

Third lesson
2 points

Second lesson 3
points

First lesson
4 points

Skills task
5 points

FINISH!

Suggest...

Compare...

Compare...

Explain...

Explain...

Explain...

Explain...

Describe ...

Describe...

Describe...

Describe...

Name...

Name...

Name...

START

SNAKES AND LADDERS
CELL BIOLOGY

COMBINED SCIENCE
FOUNDATION

You will need:
- One die
- One counter per player

START

1. Name 1 type of microscope.

2. Name the plant cells that start with X.

3. What are the parts of a cell called?

4. Name this cell.

5. Describe the process of diffusion.

6. Which process is involved in the movement of water from low to high concentration?

7. Name 2 sub-cellular structures that are found in plant cells but not in animal cells.

8. What is the function (job) of chloroplasts?

9. What is the function (job) of the cell membrane?

10. State 1 adaptation of this cell.

11. Name these: A, B, C, D.

12. TRUE or FALSE: Animal and plant cells are both prokaryotic cells.

13. Which process is used to move substances into and out of cells?

14. State 2 places where Stem Cells are found.

15. Name 4 parts of this cell.

16. Which process is involved in the movement of water from low to high concentration?

17. Name these: A, B, C, D.

18. TRUE or FALSE: Animal and plant cells are both prokaryotic cells.

19. Which process is used to move substances into and out of cells?

20. State 2 places where Stem Cells are found.

FINISH!

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Don't forget the ribosomes they both have that make proteins!

Bacteria Cell
Has cytoplasm, a cell membrane and a cell wall. But its DNA is not in a nucleus.
Cluster that hold in bacteria is called nucleoid.

Yeast Cell
Bigger than bacteria.
Can respire **aerobically** and **anaerobically** (can self make ethanol and is also called fermenter).

Adaptations of the digestive system

- Acid in the stomach giving a low pH for enzymes there.
- Large surface area for absorption in the small intestine.
- Bile to neutralise acid and create alkaline condition for enzymes in the intestine.

Adaptations for exchange in the intestines (absorbing your food)

- Large surface area
- Short diffusion pathway: only one cell between blood and air in large.
- Good blood supply: to take absorbed products of digestion - using diffusion and active transport to get to heart the nearest to the blood.
- Villi/Villous: Created up surface of intestine for really large surface area.

Specialised Cells

Remember cells are specialised for their job. Sperm cells have long tails and are good swimmers. They also have lots of mitochondria to provide the energy they need. Other examples include fat cells, nerve cells and root hair cells.

Body structure

A group of cells with similar function make up **TISSUE**.
Tissues that all work together make up an **ORGAN**.
Give the name of plants - what is an example of an organ?

Organs together make up an **ORGAN SYSTEM**. Like the digestive system.

Many organs systems = An organism!

Stem Cells

Cells that can become anything - **undifferentiated**.

Embryonic stem cells can be made into any type of cell (making all sorts of tissues) but come from aborted embryos (which can be a problem). We also don't know the long term effect of their use yet.

Adult stem cells (mouse stem cells) can also be used but can't be made into as many different things but you can get permission to have them taken. Beware the operation might be painful!

Diffusion

How things get in and out of cells...
Diffusion is where dissolved substances move from a **high concentration** (where there's lots of things) to a **low concentration** (where there's less) through a **semi-permeable membrane**.
Stomach produce (shows difference between the pink & blue diffusion)

Normal cell division

Two identical daughter cells are made from one parent cell. Each containing 23 complete pairs of chromosomes.

Cell division

Is there enough light? water? Is there enough oxygen or CO₂?
More important to (the respiration and photosynthesis)

Super IMPORTANT!!!
CO₂ + Water → Glucose + O₂

Enzymes

Enzymes are biological catalysts (they speed up reactions but aren't used up)

Remember the **active site** is very specific. Only the matching substrate will fit.

Enzymes can build up or break down substrates. Substrates include carbohydrates, proteins and fats.

Enzymes are also easily affected by pH changes. We need highly specific conditions to keep them working at their best. **OPTIMUM CONDITIONS!** (each enzyme has its own favourite conditions)

Denatured
To begin with heat will help increase collisions between the enzymes and substrates BUT too hot and it will denature (remember denature MGT do)

Useful Enzymes:
Proteases used in baby food.
Biological washing powders contain enzymes to break down food stains.

Photosynthesis

Leaves are adapted for photosynthesis

Leaves have a big surface area to absorb as much light as possible

Chloroplasts are found in the green parts of plants and contain the chlorophyll

Hydroponics

Hydroponics is a way of growing plants in water with the perfect balance of nutrients. The temperature is also controlled. Lights are kept on and CO₂ is pumped into the greenhouse.

To make hydroponic plants also need to absorb Nitrates from the soil to build amino acids. No nitrates will lead to stunted growth

Limiting Factors

The rate of photosynthesis may be slowed by a lack of light, CO₂ or if it's too cold. (Temperature is a limiting factor as enzymes are affected)

Increased by the temperature will speed up photosynthesis in the plant it gets too hot and enzymes denature

Plants also use temperature to make chlorophyll! No Chlorophyll = Yellow Leaves

Biology Paper 1

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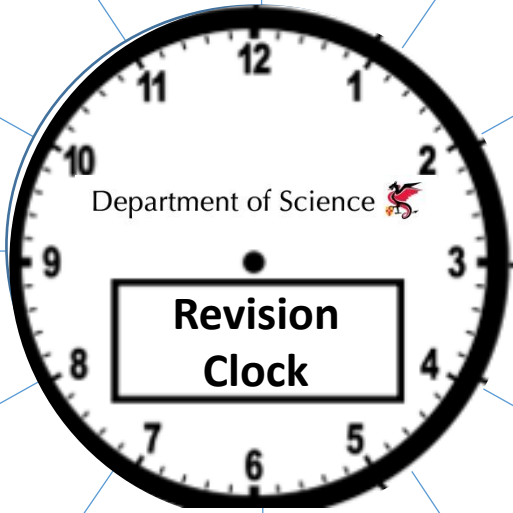
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sheet.
Fold and
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again

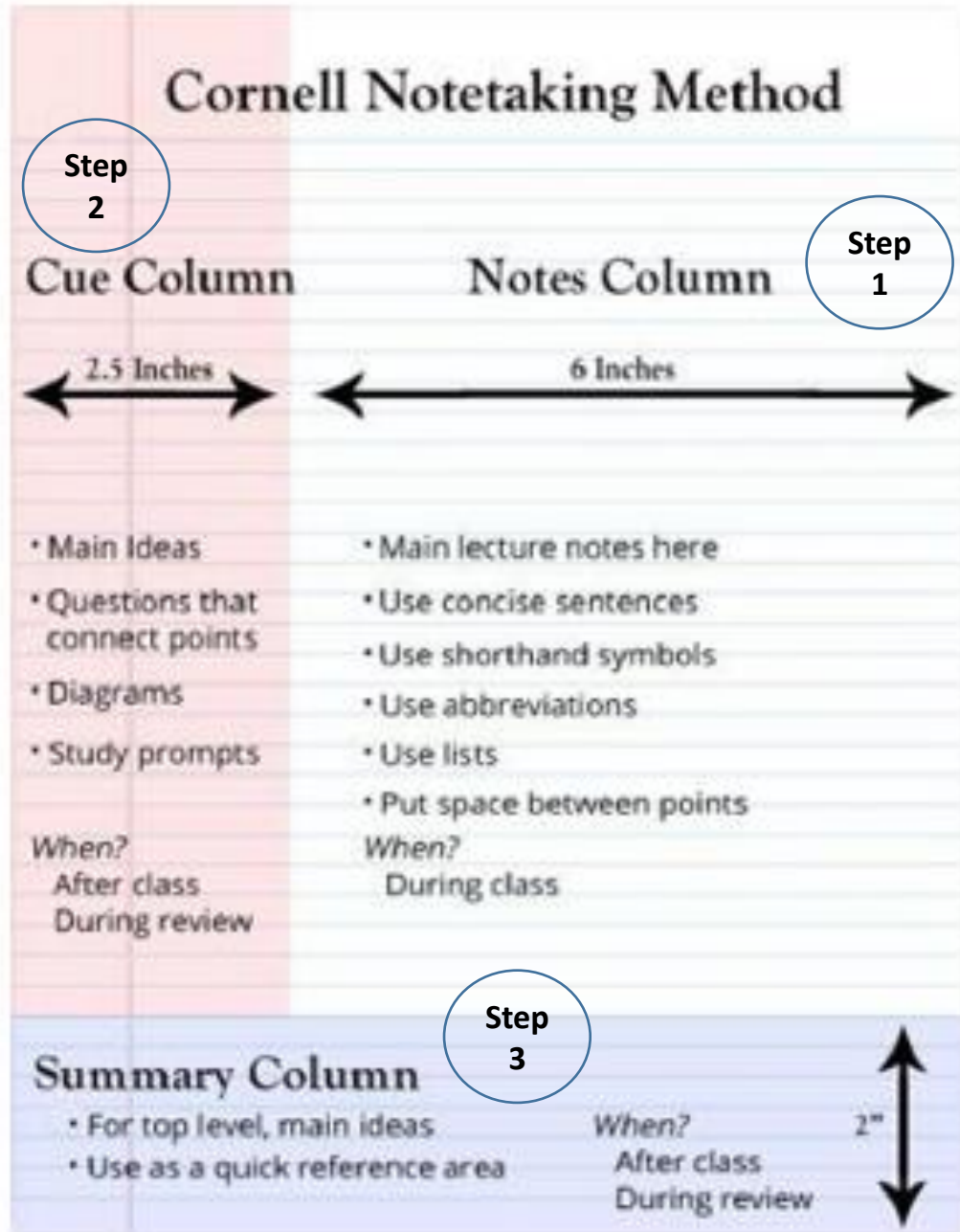
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Helps to keep notes **organised**.

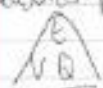

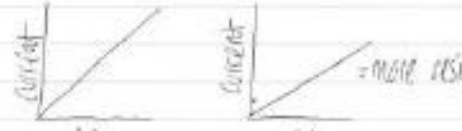
Creates **study sheets**.

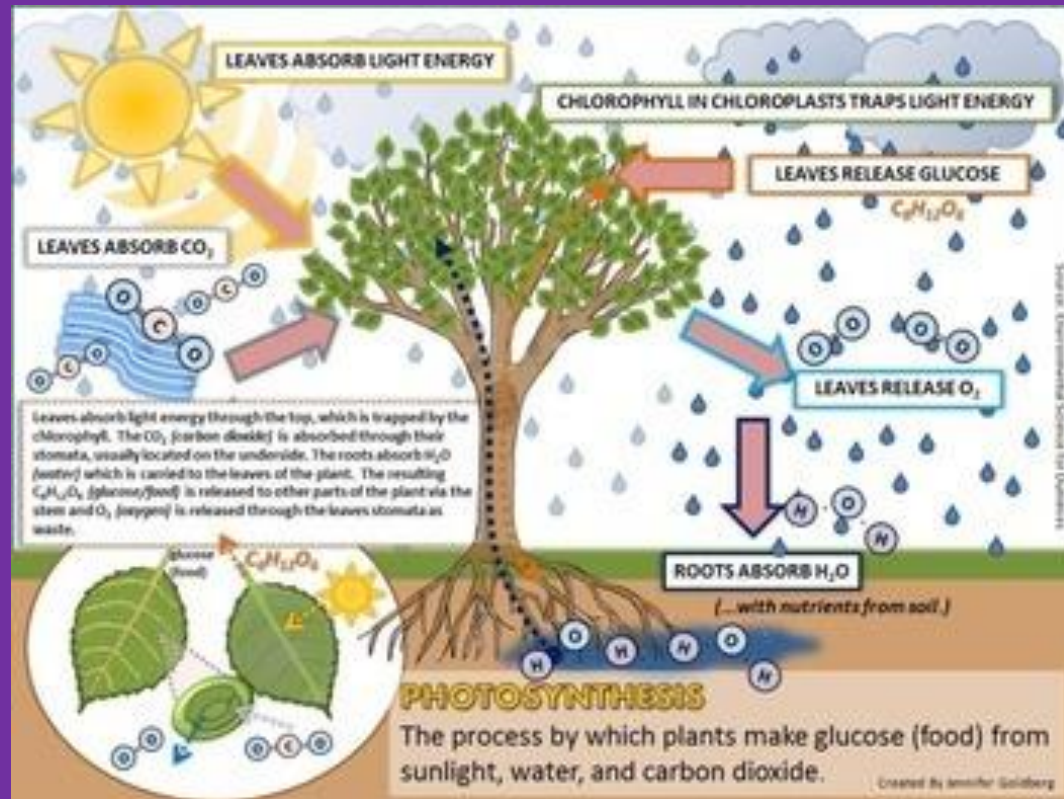
Can quickly and identify **key words** and **key concepts**.

Notes can easily be used as a **study guide** for exams preparation and for **self-quizzing**

Examples

	<u>Electrolysis</u>
Meaning	• breaking down using electricity → current used to breakdown ionic compound.
Method	<p style="text-align: center;">↓ electrolyte</p> <p>• 2 electrodes that go into the electrolyte</p> <p>conducting rods - (+) terminal = anode not reactive eg graphite (-) terminal = cathode</p> <p>• Opposite charges attract - (+) ions move to cathode - (-) ions move to anode</p> <p>• ions move to electrodes → lose charge → elements</p> <p style="text-align: center;">↓ gas formed or metal deposited</p> <p>eg - potassium (found in salt) eg - zinc (more room for electrons to move → conduct electricity) eg - substances</p>
What happens	<p>+ ⚡ -</p> <p>• some ionic compounds → v high melting points • some ionic compounds → can be dissolved in water = causes electrons to move • (aq) → aqueous = dissolved in water</p>
Why it happens	<p>• Electrolysis breaks down a substance using electricity</p> <p>• Ionic compounds can be electrolysed when melted = molten or dissolved in water</p> <p>• Electrons are free to move to carry a charge</p> <p>• Positive ions move to the cathode, negative ions move to electrode</p>

Potential Difference (p.d.)	<p>Potential difference & resistance</p> <p>• battery forces electrons to pass thru components</p> <p>• Ammeter → measures current (amps) connected in series</p> <p>• Voltmeter → measures p.d across components (volts) if connected in parallel</p> <p>• P.D = $\frac{\text{energy transferred to the bulb to each coulomb of charge (J)}}{\text{charge (C)}}$</p>
Resistance	<p>Atoms in metals resist (stop) electrons passing thru them</p> <p>$\text{Resistance} = \frac{\text{potential difference (V)}}{\text{current (I)}}$</p> <p style="text-align: center;">↓ (ohms)</p> <p>• Resistors in circuits limit current. large resistance = small current</p>
Current & pd graphs	<p>• current is directly proportional to p.d</p> <p>• Ohm's law = current thru a resistor at constant temp is directly proportional to p.d across resistor</p> <p>• Ohmic conductor = metal wire whos resistance is constant as current changes → (only when temp is constant)</p> <p>• less steep the line → greater resistance</p>
	<p>An ammeter measures current in amps & connected in series, a voltmeter measures p.d & connected in parallel</p> <p>Resistance stops electrons from moving freely.</p> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">  </div> <div style="margin-right: 20px;">  </div> <div>  </div> </div>



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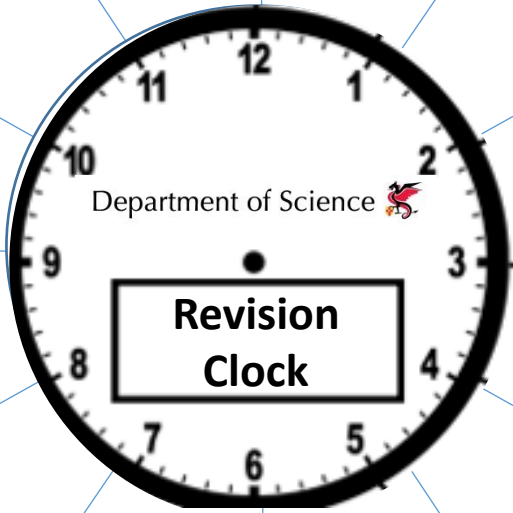
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Summarise
the topic
into one
sheet.
Fold and
summarise
again

Summarise
the topic.

1. Cue column

2. Notes column

3. Summary column



Combine words
and pictures

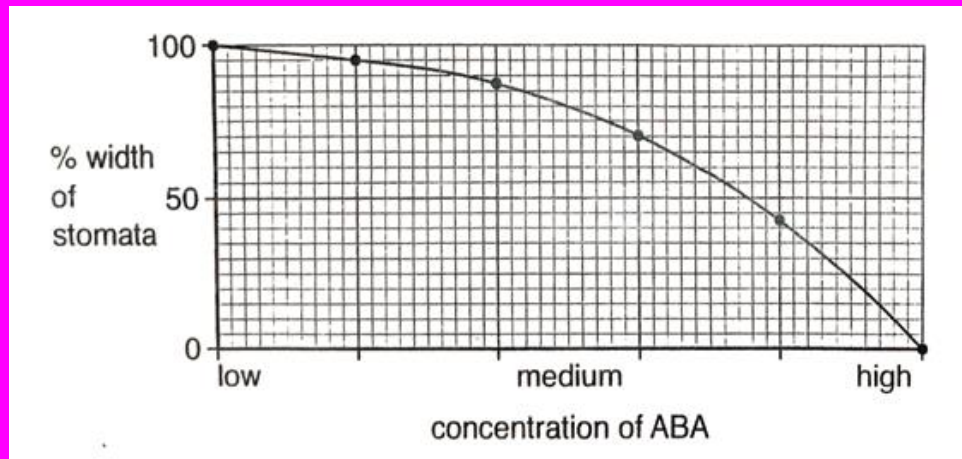
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Topic place mats

1) Describe the effects of increasing concentration of ABA on the width of the stomata. [3]

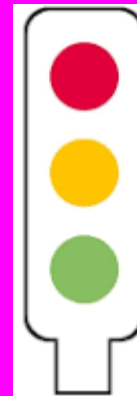
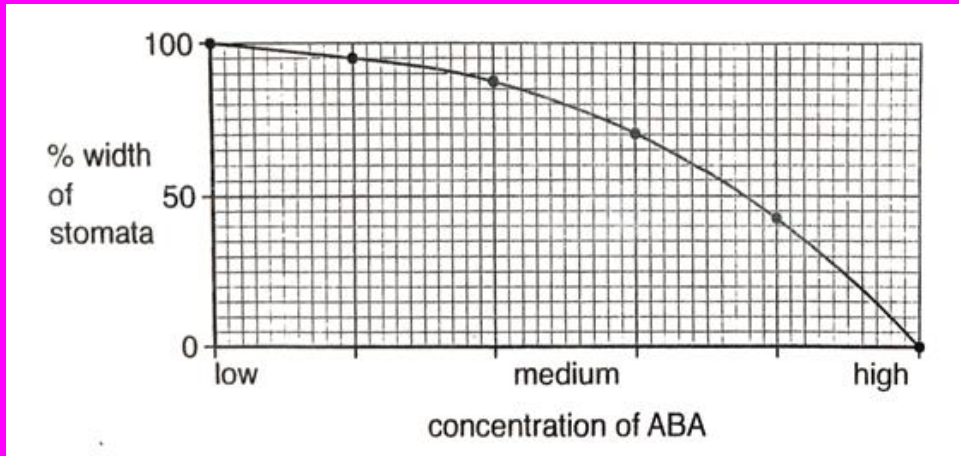


COMMAND WORDS

Command words are the words and phrases used in exams that tell you **how** to answer a question.

Command Words	Meanings – (what you are expected to do when these words appear in questions in exam)
1. Calculate	Use numbers given in the question to work out the answer.
2. Choose*	Select from a range of alternatives.
3. Compare	Describe the similarities and/or differences between things, not just write about one.
4. Complete	Answers should be written in the space provided, for example, on a diagram, in spaces in a sentence or in a table
5. Define*	Specify the meaning of something.
6. Describe	Recall some facts, events or process in an accurate way.
7. Design*	Set out how something will be done.
8. Determine*	Use given data or information to obtain and answer
9. Draw	To produce, or add to, a diagram. Estimate Assign an approximate value.
10. Estimate	Assign an approximate value.
11. Evaluate	Use the information supplied as well as their knowledge and understanding to consider evidence for and against.
12. Explain	Make something clear, or state the reasons for something happening.
13. Justify	Use evidence from the information supplied to support an answer.
14. Give	Only a short answer is required, not an explanation or a description.
15. Identify*	Name or otherwise characterise. Justify Use evidence from the information supplied to support an answer.

1) Describe the effects of increasing concentration of ABA on the width of the stomata. [3]

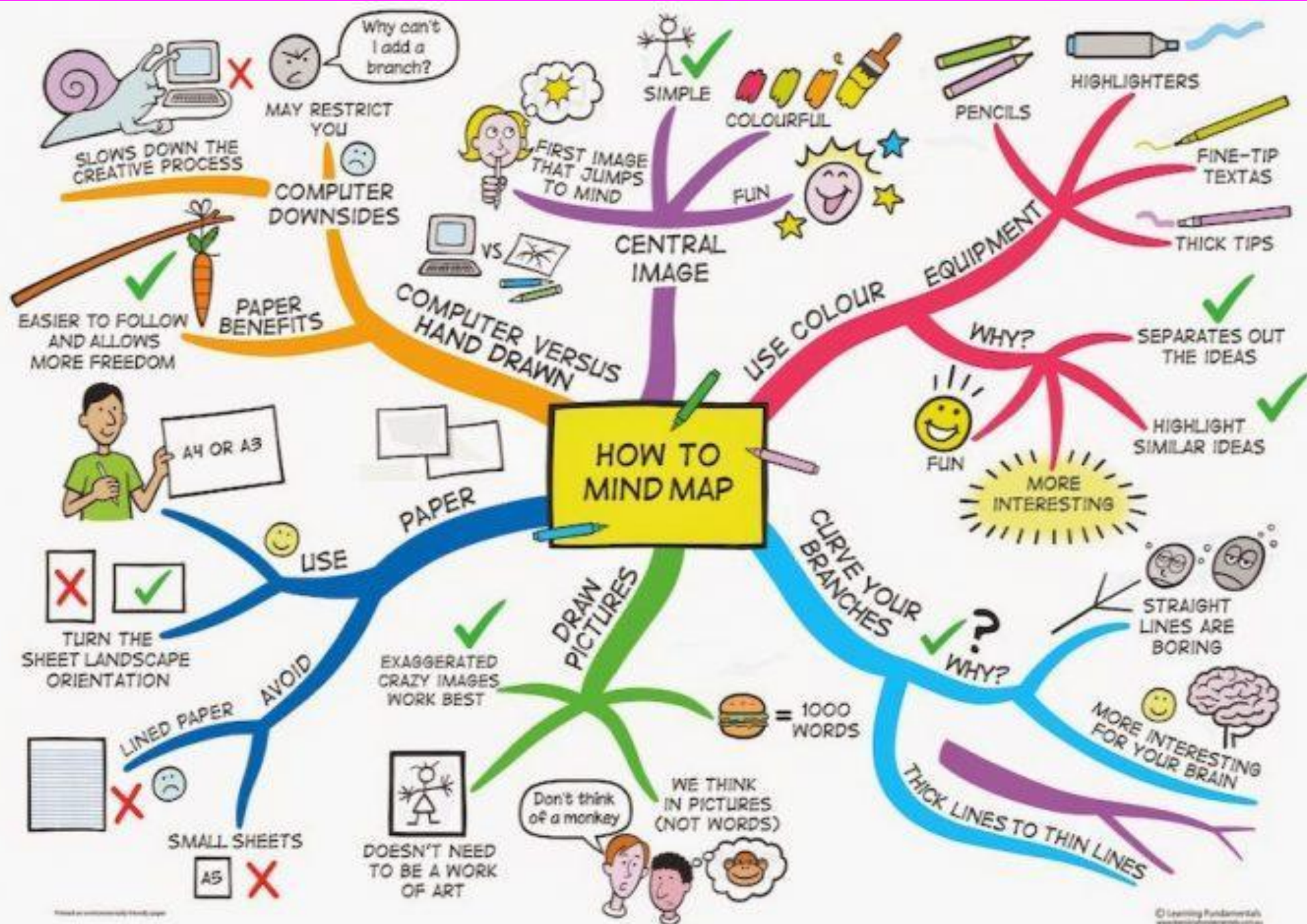


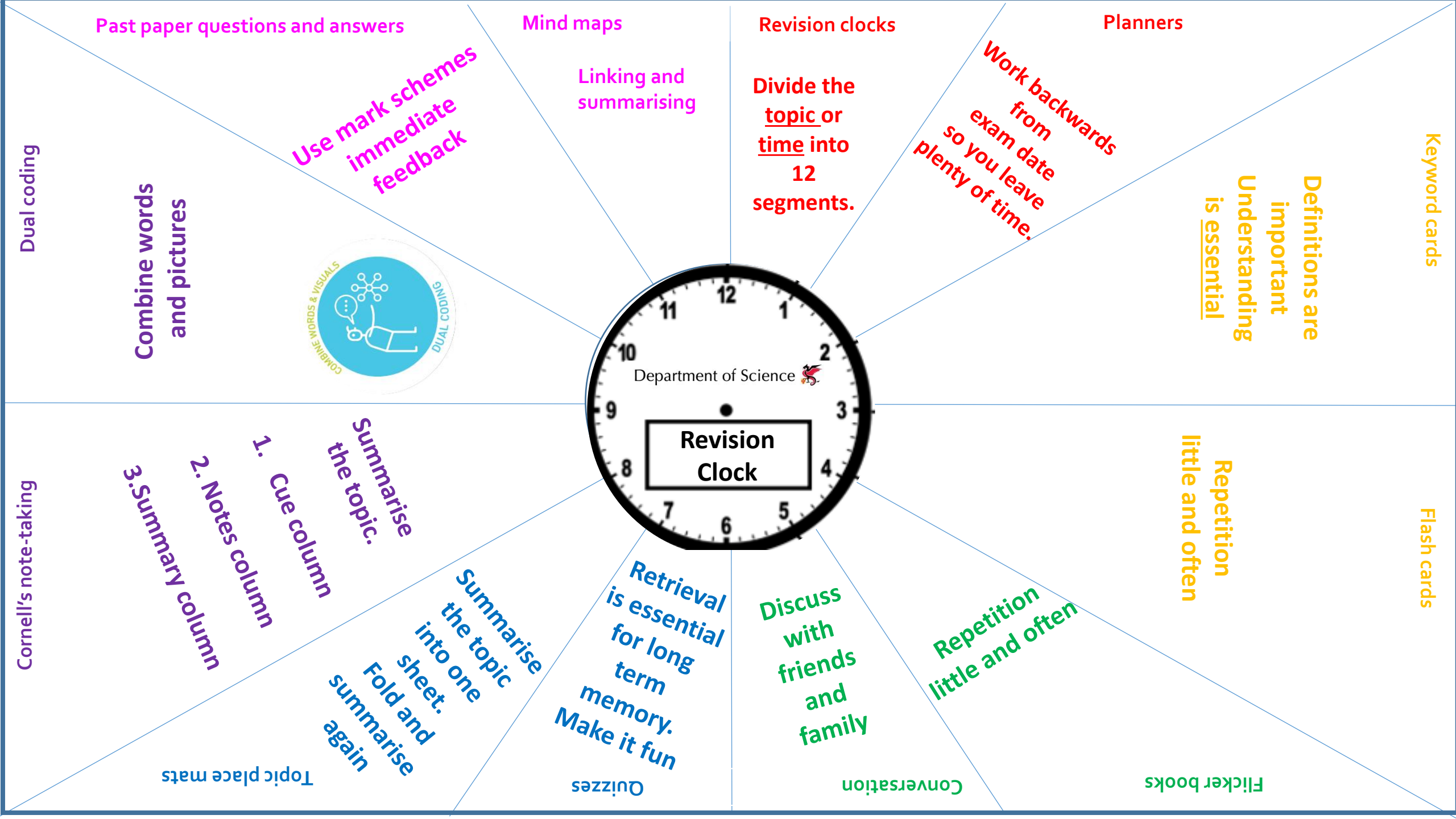
- As the concentration of ABA increases the percentage width of the stomata decreases
- As the concentration shifts from low to medium the width closes to 75%
- As the concentration moves from medium to high the width of the stomata reduces dramatically and they are closed in high concentrations

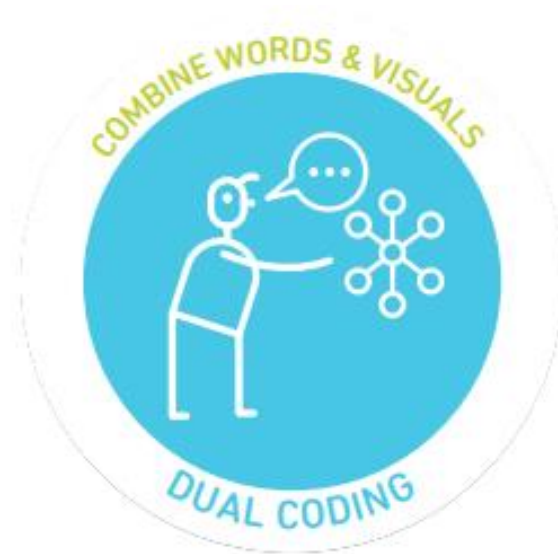
COMMAND WORDS

Command words are the words and phrases used in exams that tell you **how** to answer a question.

Command Words	Meanings – (what you are expected to do when these words appear in questions in exam)
1. Calculate	Use numbers given in the question to work out the answer.
2. Choose*	Select from a range of alternatives.
3. Compare	Describe the similarities and/or differences between things, not just write about one.
4. Complete	Answers should be written in the space provided, for example, on a diagram, in spaces in a sentence or in a table
5. Define*	Specify the meaning of something.
6. Describe	Recall some facts, events or process in an accurate way.
7. Design*	Set out how something will be done.
8. Determine*	Use given data or information to obtain and answer
9. Draw	To produce, or add to, a diagram. Estimate Assign an approximate value.
10. Estimate	Assign an approximate value.
11. Evaluate	Use the information supplied as well as their knowledge and understanding to consider evidence for and against.
12. Explain	Make something clear, or state the reasons for something happening.
13. Justify	Use evidence from the information supplied to support an answer.
14. Give	Only a short answer is required, not an explanation or a description.
15. Identify*	Name or otherwise characterise. Justify Use evidence from the information supplied to support an answer.










<u>Keyword</u>	<u>Definition</u>
Spaced practice	Start planning early for exams and set aside a little bit of time everyday. Five hours spread out over two weeks is better than the same five hours all at once. This is one of the most effective revision strategies. The ideal is 20-30 minutes per session.
Interleaving	Interleaving is a process where students mix & combine multiple subjects & topics while they study in order to improve their learning. Rather than studying one topic for a long time before moving to another. This leads to better long-term memory.
Elaboration	This involves explaining and describing ideas in lots of detail, asking further questions about what you are learning and making links to help you connect new information with what you already know.
Concrete examples	Concrete examples involves finding & using specific, real-life examples to help develop & deepen understanding of abstract ideas. Abstract ideas can be difficult to understand & explain. Our memories find it easier to remember concrete examples better than abstract information.
Dual coding	Dual coding is the process of combining verbal materials with visual materials. There are many ways to visually represent materials, such as with infographics, timelines, cartoon/comic strips, diagrams and graphic organisers.
Retrieval practice	Through the act of pulling information out from your long term memory (retrieval), our memory for that information is strengthened and forgetting is less likely to occur. We are more likely to remember it when we need to.



Just Get Started

The First Step is Always the
Hardest