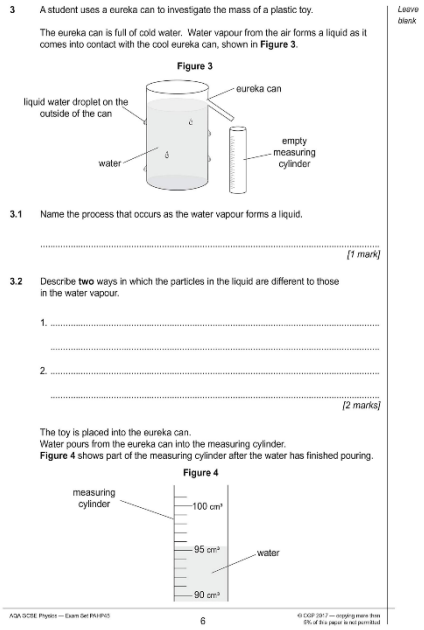
Embedding Exam Practice in the Science Curriculum

It is vital for children to become familiar with exam board resources before they get near any mock or real exams.

Understanding the style, structure and language of the questions from as early as possible in KS4 will allow children to be better prepared to sit the real exam papers in Year 11

Exam questions shouldn't really just be found in exam papers. They can be embedded across your curriculum to increase confidence, apply and retrieve knowledge. Although we should be cautious about throwing too many exams at pupils and not bringing down too many GCSE exam questions into KS3, there are many benefits to exposing pupils to exam questions frequently in low stakes situations. Below are some examples of how you can do this.



3 A student uses a eureka can to investigate the mass of a plastic toy. *Leave blank*

The eureka can is full of cold water. Water vapour from the air forms a liquid as it comes into contact with the cool eureka can, shown in **Figure 3**.

Figure 3

3.1 Name the process that occurs as the water vapour forms a liquid.

..... *[1 mark]*

3.2 Describe **two** ways in which the particles in the liquid are different to those in the water vapour.

1. .....

.....

2. .....

..... *[2 marks]*

The toy is placed into the eureka can.
Water pours from the eureka can into the measuring cylinder.
Figure 4 shows part of the measuring cylinder after the water has finished pouring.

Figure 4

Application of Knowledge questions The AoK Strategy.

After a sequence of teaching knowledge and checking for secure understanding, you would want to provide children with opportunities to apply that knowledge in a context.

This can take a number of forms like a proper scientific enquiry challenge or attempting a challenging exam question.
Longer 4-6 mark questions are good for this, e.g. required practical method questions. They can be peer marked, redrafted and then teacher marked for further improvements.

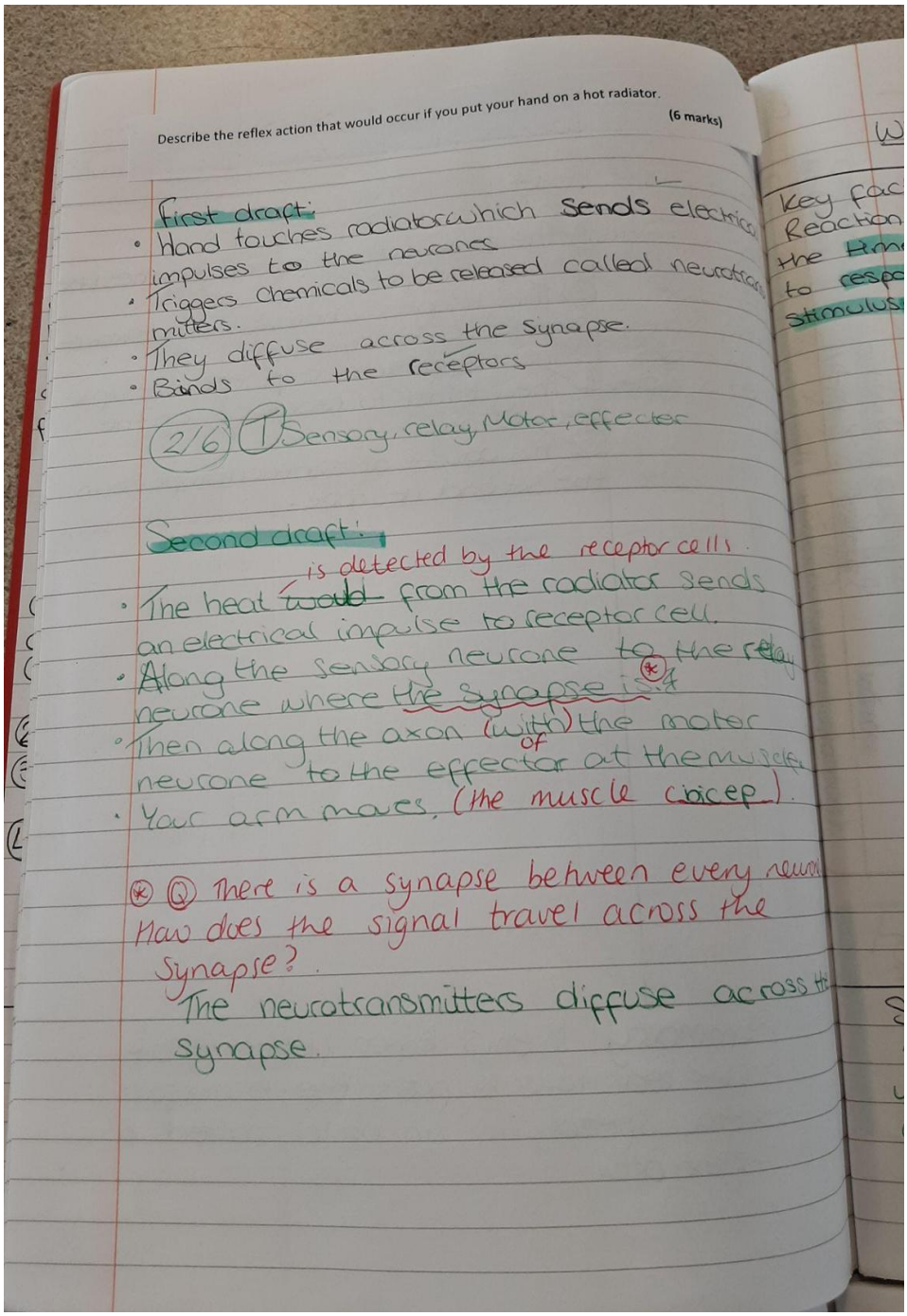
These should not just be random and left up to individual teachers. They should be pre-planned and sequenced in the curriculum at appropriate points to make sure they are given at the right time.

Once sequenced in the curriculum, the teacher when they reach this point will provide the pupils with the question and they will have a go. This should be under exam conditions at this point with roughly the time needed to answer the question, e.g. 6 marks = 6 minutes.

This is then peer assessed against the marking criteria and improvements suggested. A complete redraft is then attempted, again under exam conditions.

The teacher then marks the redraft and suggests further improvements or questions them further to probe deeper understanding. You can see this in action in the images below. You can see in the three images that the first draft has been peer-assessed and key missing areas identified.

The redraft is then completed (here in green pen) and then teacher marked. The teacher also posed a further probing question which the pupil responded to.

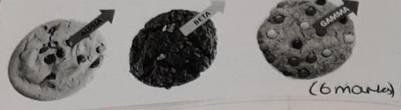


Application as knowledge

Question 1

There are 3 cookies, each emits a different types of radiation. You have to decide which cookie to eat, put in your pocket and to put in a lead lined box.

Explain what you would do with each cookie and why.



(6 marks)

1st draft

3/6 I would eat the gamma radiation. This is because gamma radiation is able to pass through skin and your body so if is injested it would just pass through. Gamma would also do the least damage to your body. I would put alpha radiation in my pocket. This is because alpha radiation can be stopped by skin and will not do damage to your insides as skin can stop it. I would put beta in a lead lined box. This is ~~set~~ because beta radiation can be stopped by lead. Alpha is the most ionising and would cause most damage if injested. (least penetrating) Beta is weakly ionising - would cause some damage if injested. Moderately penetrating. Gamma very weakly ionising. Most penetrating

2nd draft

I would eat gamma radiation. This is because gamma is very weakly ionising and would cause the least damage if injested it would just pass through. Gamma is also the most penetrating and can go through the skin and leave the body. I would put alpha in my pocket. This is because alpha is the most ionising and would cause the most damage if injested. It is also the least penetrating and can be stopped by skin. I would put beta in a lead lined box because it is weakly ionising and would cause some damage and is moderately penetrating and can be stopped by aluminium.

6/6

Q Why would gamma be used in medical procedures?

They pass through packaging and syringe they will kill viruses and bacteria.

Describe the reflex action that would occur if ... (6 marks)

First draft

- so when the hand touches the radiator your nerves called receptors ~~impulse~~
- They send an electrical impulse down their axon to the end which triggers chemicals to be released
- they travel across the synapse to the next nerve where they bind to it and send another electrical impulse down the nerve

2/6 I missed the words relay neurone sensory neurone, motor neurone effector

Second draft

when the hand touches the radiator it sensory receptor neurones sends an electrical impulse down the neurones. Thes gets sent down the relay neurone in the spinal cord. thus sends another electrical impulse down the motor neurone which ~~eatss~~ causes the muscle (effector) to contract and move away from the radiator ✓ good.

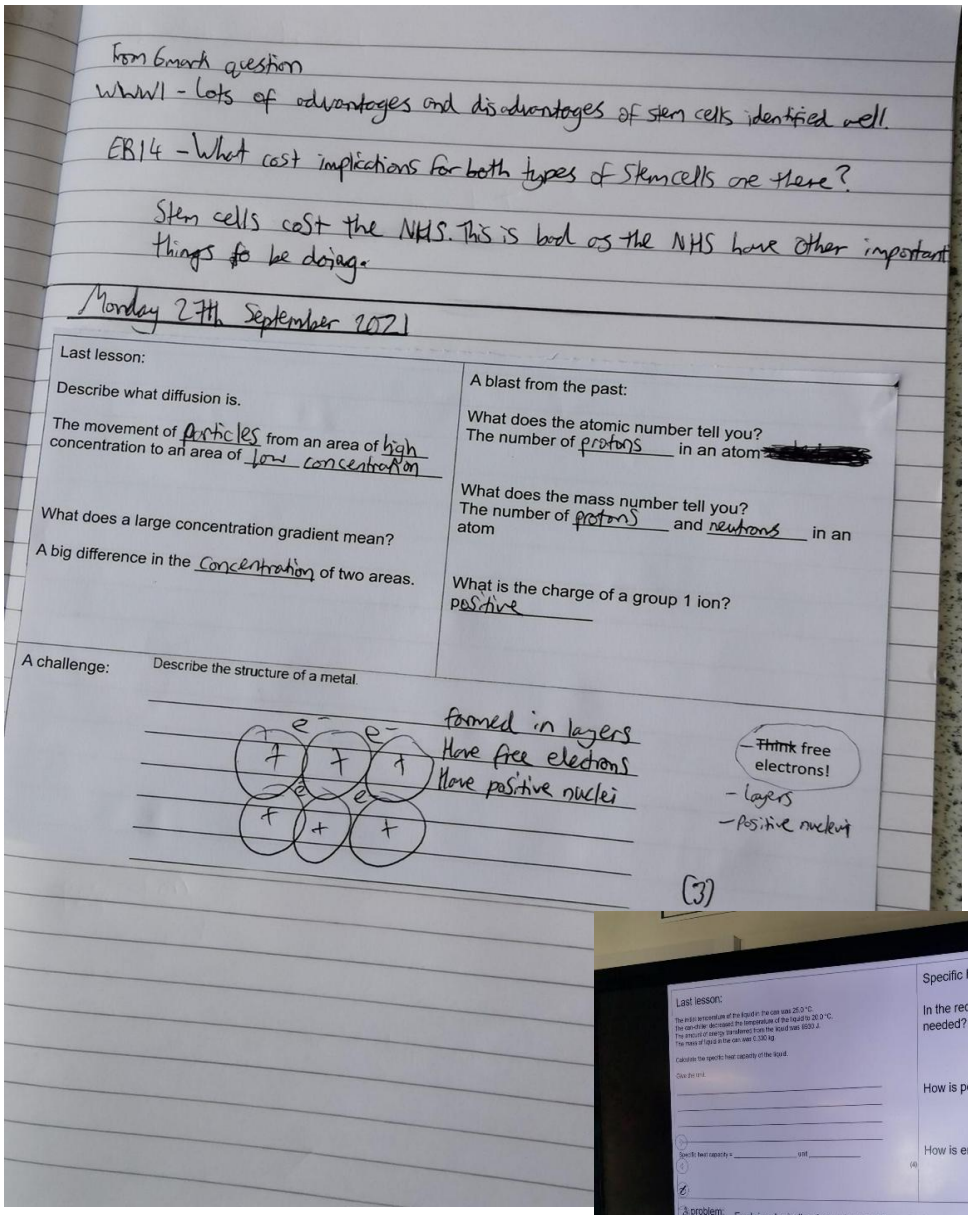
Q what would happen if the myelin sheath around the motor neurone was damaged?

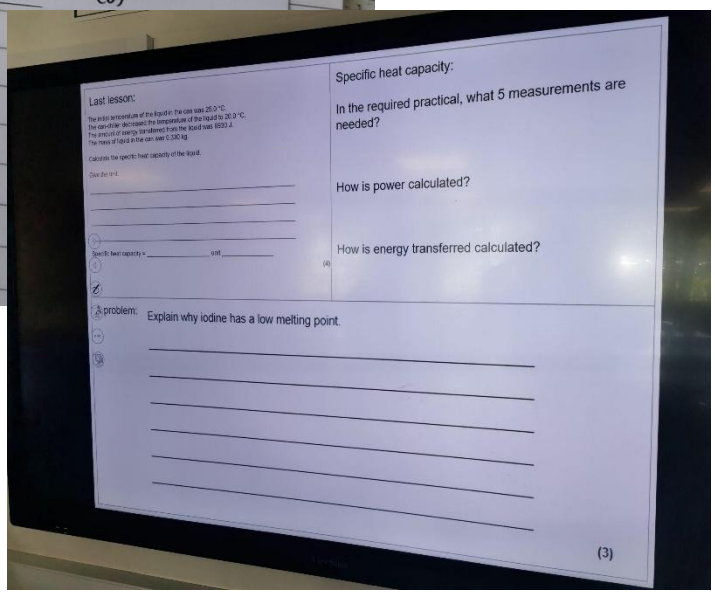
It would stop the neurone transmitting electrical pulses

Exam questions as part of retrieval practice

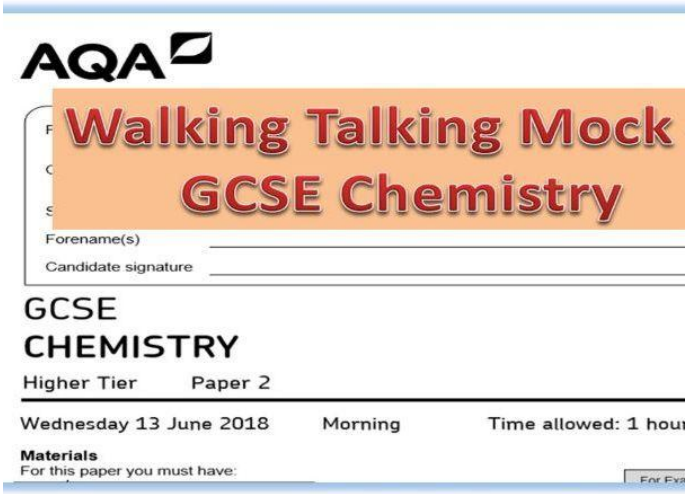
Providing plenty of opportunities for exam questions can be tricker when there is a lot of content to teach so including them as part of your retrieval practice routine allows for more exposure under low-stakes situations.
Shorter 2-3 mark questions can be incorporated into retrieval practice with ease.

In this school, at the start of every lesson children are given one of these sheets. It has some standard retrieval questions from the last lesson and from a long time ago but at the bottom has a short 2-3 mark exam question for pupils to attempt.
Depending on the set there may be some hints or guidance next to the question too.





Walking Talking Mock (WTM)



Walking talking mocks are a useful way of prepping students for exams but without the high stakes pressure of a full mock exam.
It involves setting up an exam-like situation in a hall. The teacher in charge of the WTM has chosen a paper and prepped for some of the major question sequences (not all of the paper).
The Teacher will lead the paper from the front directing students to the questions, getting them to underline command words, point out any tricks or common mistakes (examiner report issues,) and guide them through the question(s). Using a visualiser to model how to work through a question is far more useful than PowerPoint slides as its live and pupils can replicate you in real-time.
Some retrieval of the domain knowledge the question sits in is also useful at this point. The WTM can be done in the classroom, but works better in the hall where real exams will take place.

End of topic tests/ mock exam reviews

A common practice for end-of-topic tests and mock exams is to sit the class down and go through each question one by one.
This has some problems. The students who did well will switch off. The students who didn't do well are just getting that failure reinforced as they are forced to sit through question after question where it was either wrong or blank. It's not enjoyable for them or beneficial for them either.

A better approach is for the teacher to identify two or three questions that the majority of the class got wrong. Then spend some time reteaching some of the core knowledge from that domain. Show where most went wrong in the question and how it should have been answered using a visualiser. Then give students another similar question from the same knowledge domain to attempt and then mark this together as a class.