

Clear Revise®

BTEC Tech Award Level 1/2 in **Sport**

Illustrated revision and practice

Component 3: Developing fitness to improve performance

Published by
PG Online Limited
The Old Coach House
35 Main Road
Tolpuddle
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PREFACE.

Absolute clarity! That's the aim.

This is everything you need to ace the examined component in this course and beam with pride. Each topic is laid out in a beautifully illustrated format that is clear, approachable and as concise and simple as possible.

Each section of the PE specification is clearly indicated to help you cross-reference your revision. The checklist on the contents pages will help you keep track of what you have already worked through and what's left before the big day.

We have included worked exam-style questions with answers for almost every topic. This helps you understand where marks are coming from and to see the theory at work for yourself in an exam situation. There is also a set of exam-style questions at the end of each topic for you to practise writing answers for. You can check your answers against those given at the end of the book.

LEVELS OF LEARNING

Based on the degree to which you are able to truly understand a new topic, we recommend that you work in stages. Start by reading a short explanation of something, then try and recall what you've just read. This has limited effect if you stop there but it aids the next stage. Question everything. Write down your own summary and then complete and mark a related exam-style question. Cover up the answers if necessary but learn from them once you've seen them. Lastly, teach someone else. Explain the topic in a way that they can understand. Have a go at the different practice questions – they offer an insight into how and where marks are awarded.

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First edition 2024 10 9 8 7 6 5 4 3 2 1

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THE SCIENCE OF REVISION

Illustrations and words

Research has shown that revising with words and pictures doubles the quality of responses by students. This is known as 'dual-coding' because it provides two ways of fetching the information from our brain. The improvement in responses is particularly apparent in students when they are asked to apply their knowledge to different problems. Recall, application and judgement are all specifically and carefully assessed in public examination questions.

Retrieval of information

Retrieval practice encourages students to come up with answers to questions.² The closer the question is to one you might see in a real examination, the better. Also, the closer the environment in which a student revises is to the 'examination environment', the better. Students who had a test 2–7 days away did 30% better using retrieval practice than students who simply read, or repeatedly reread material. Students who were expected to teach the content to someone else after their revision period did better still.³ What was found to be most interesting in other studies is that students using retrieval methods and testing for revision were also more resilient to the introduction of stress.⁴

Ebbinghaus' forgetting curve and spaced learning

Ebbinghaus' 140-year-old study examined the rate at which we forget things over time. The findings still hold true. However, the act of forgetting facts and techniques and relearning them is what cements them into the brain.⁵ Spacing out revision is more effective than cramming – we know that, but students should also know that the space between revisiting material should vary depending on how far away the examination is. A cyclical approach is required. An examination 12 months away necessitates revisiting covered material about once a month. A test in 30 days should have topics revisited every 3 days – intervals of roughly a tenth of the time available.⁶

Summary

Students: the more tests and past questions you do, in an environment as close to examination conditions as possible, the better you are likely to perform on the day. If you prefer to listen to music while you revise, tunes without lyrics will be far less detrimental to your memory and retention. Silence is most effective.⁵ If you choose to study with friends, choose carefully – effort is contagious.⁷

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CONTENTS AND CHECKLIST

Topic A Explore the importance of fitness for sports performance **Specification point** $\overline{\mathbf{V}}$ Α1 A2 A2 A.3 Topic B Investigate fitness testing to determine fitness levels **Specification point** $\overline{\mathbf{A}}$ B1 B1 B1 П B2. B4 B3 B4 **B4 Topic C** Investigate different fitness training methods **Specification point** \square C1 Warm-ups 30 C1 Cool downs 31 C1, C2, C4 C1. C3. C4 C5

C6

Topic D Investigate fitness programming to improve fitness and sports performance

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MARK ALLOCATIONS

Green mark allocations^[1] on answers to in-text questions throughout this guide help to indicate where marks are gained within the answers. A bracketed '1' e.g. ^[1] = one valid point worthy of a mark.

In longer answer questions, a mark is given based on the whole response. In these answers, a tick mark $[\checkmark]$ indicates that a valid point has been made. For a mark, a judgement should be made using the levels-based mark scheme on **page 59**.

There are often many more points to make than there are marks available so you have more opportunity to max out your answers than you may think.

COMMAND VERBS

The exam paper that you take will use the following command verbs in each question. You may understand lots about a topic, but if you do not answer each question in the correct way, the mark you get may be very low.

Study each of the below command verbs along with their meanings and how they are used to answer a question.

Give

Recall one or more pieces of information. These are short answers with 1 mark for each point.

Give two benefits of a warm up

[2]

To increase body temperature,^[1] and increase the range of movement.^[1]

State or name

Recall facts, terms or processes, or provide the correct answer to the given context.

Name **one** type of technology Jo can use to measure exercise intensity.

[1]

Smartwatch with a heart rate monitor built in.^[1]

Complete

Provide some missing information for a given table or diagram.

Adnan is looking to start regular fitness training with a local provider. Complete **Table 1** by naming **two** types of provision.

Type of provision				
(i)	Private [1]			
(ii)	Voluntary ^[1]			
Table 1				

Draw

Match one option to a choice of five possible answers.

Draw a straight line to match the test method to the correct component of fitness.

Agility Balance Vertical Coordination jump test Power^[1] Reaction time

Describe

Present two (or more) linked descriptive points on characteristics, features, uses or processes. You do not need to include a justification or reason.

Describe what is meant by intrinsic motivation. [2]

[1]

Intrinsic motivation comes from within the performer. [1] They may want to feel a sense of accomplishment, pride or satisfaction.[1]

TOPICS FOR COMPONENT 3

Developing fitness to improve other participants performance in sport and physical activity

Information about the externally assessed exam:

Specification coverage

The importance of fitness for sports performance, fitness testing to determine fitness levels, and different fitness training methods.

The content for this assessment will be drawn from the essential subject content in Topics A to D of Component 3 in the specification.

Assessment

Written exam: 90 minutes

60 marks

All questions are mandatory 40% of the qualification grade

Assessment type: External synoptic

Guided learning hours: 48

Questions

A mix of short answer and longer answer questions assessing knowledge, understanding and skills in contextual scenarios building on all components within the qualification.

TYPES OF SPORTS REQUIRING SPECIFIC COMPONENTS OF FITNESS

Performance in sport can be improved by concentrating on the appropriate components of physical and skill-related fitness in training.

Team sports may require players to have different strengths depending on the position they play in. A rugby prop is likely to need greater power and strength, whereas a winger is likely to rely more on speed and agility.

Aerobic endurance – The ability of the heart and lungs to supply oxygen to the working muscles. Required for events and sports that last more than 30 minutes.



Marathon and endurance runners need to be able to maintain a high volume of oxygenated blood to the working muscles for a long period.

Muscular strength -

The ability to overcome a resistance is useful for activities requiring force.

Javelin throwers

require high muscular strength to force the javelin through the air over the furthest possible distance.





Speed – The ability to move body parts to perform an action quickly is useful for activities requiring fast movement.

Sprinters and tennis players require speed to move quickly across the track or court.

Muscular endurance - The ability of a muscle or muscle group to undergo repeated contractions, without fatigue. This is also required for events and sports that last more than 30 minutes.



Triathletes require muscular endurance for running, swimming and cycling to reduce fatigue in muscles repeatedly contracting.



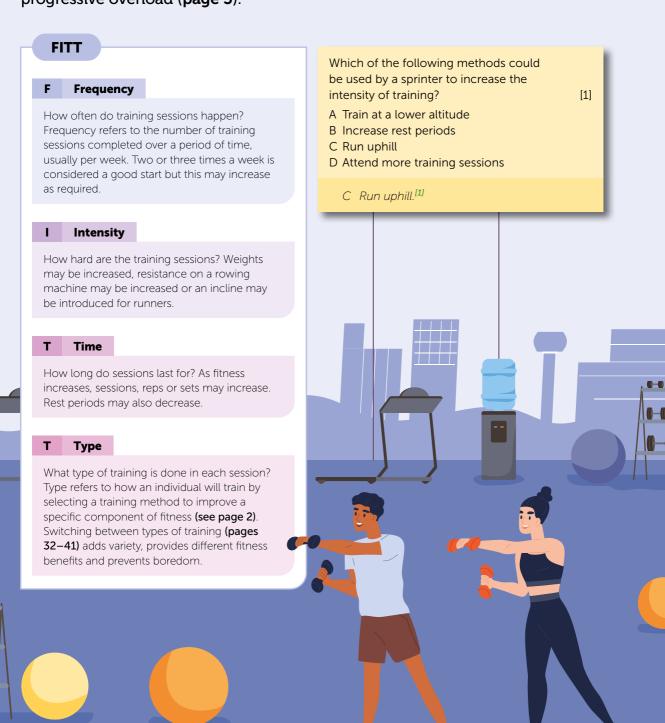
Flexibility - The range of movement around a joint. Flexibility is useful for activities where performance is improved by greater movement.

Gymnasts, divers, martial artists and figure skaters require excellent flexibility to increase their range of movement and to reduce injury.

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THE BASIC PRINCIPLES OF TRAINING

The elements of FITT are useful in optimising a training plan in order to achieve fitness goals. FITT can also be used to apply the principle of progressive overload (page 5).



EXAMINATION PRACTICE

1.	Darren plays tennis and begins training harder, and for longer.	
	(a) Which training principle is Darren using?	[1]
	□ A – Specificity	
	☐ B – Progressive overload	
	□ C – Reversibility	
	□ D – Rest and recovery	
	(b) Which one of the following sports requires high agility?	[1]
	□ A – Freestyle skiing	
	□ B – Javelin	
	□ C – Sprinting	
	□ D – Weightlifting	
	Agility, balance, fast reaction time, strength and coordination are all useful components of fitr for a tennis player.	ness
	(c) State what is meant by agility.	[1]
	(d) Name one other component of fitness useful to a tennis player.	
	State why this is important for a tennis player.	[2]
2.	Jason plays football for his local team. He applies the basic principles of training, FITT.	
۷.	(a) Which one of the following represents the 'F' in FITT?	[1]
	□ A – Frequency	[±]
	□ B – Friendship	
	□ C – Force	
	□ D – Future	
	Jason is starting to find that his training is getting easier and becoming less effective.	
	(b) Give two ways in which Jason can increase the intensity of his training.	[2]
	Jason uses the Borg (6–20) Rating of Perceived Exertion (RPE) scale in his training.	[1]
	(c) Give one example of an activity likely to get a 6–8 on the scale. (d) Jason perceived his activity level to be a 14.	[1]
	Give his likely peak heart rate during the activity.	[1]
	Jason is 50 years old.	
	(e) Calculate his maximum heart rate.	[1]
	(f) Jason uses a heart rate monitor during exercise. It reads a peak at 145 BPM.	
	State whether Jason is training in the aerobic or anaerobic zone at this heart rate.	[2]
	Show your working.	
	(g) Name one additional type of technology used to measure exercise intensity.	[1]

FITNESS TEST METHODS FOR THE COMPONENTS OF PHYSICAL FITNESS

Each of the components of fitness can be linked to various sports and can help to plan, carry out, monitor and evaluate exercise and training programmes to suit individual needs.



Aerobic endurance

Aerobic endurance or **stamina** is the ability of the body to continue using energy from the aerobic energy system over a period of time. It can be measured using the multistage fitness test, the Yo-Yo test, the Harvard step test or the Cooper 12-minute run/walk test.

Marathon and endurance runners

need aerobic endurance to be able to maintain a high volume of oxygenated blood to the working muscles for a prolonged period.

Multi-stage fitness (bleep) test

Cones, an assistant and a measuring tape of at least 20m in length are required to set up the bleep test. An audio player and recording of the bleeps is also required at the start.



When the assistant begins playing the recording of the bleeps, the participant must run 20 metres to reach the other cone before the next bleep. The time interval between bleeps gets progressively shorter, requiring faster and faster shuttle runs between the cones. Failure to reach the cone before the bleep, twice in a row, ends the test, and the last properly completed level should be recorded. The score is usually recorded as a level and bleep number, for example 5/7.

Cooper 12 minute run/swim test

Participants of the Cooper test aim to cover as much distance as they can in 12 minutes using a track (or pool), some distance markers, recording sheets and a stopwatch. Distance is usually measured in kilometres or miles. The test can be carried out on multiple people at the same time.

Expected performance is based on gender and age, but range between a score of 'Excellent' over 2800 metres for a male in his twenties, and a score of 'Poor' with 1100 metres. for a woman in her fifties.

Kenneth Cooper MD created the Cooper test in 1968 to measure the maximum amount of oxygen that a person can use during exercise.

The test is still used in the military for stamina.



Muscular strength

Muscular Strength is the maximum force a muscle, or group of muscles can apply against a resistance. It can be further categorised as maximal, static, dynamic and explosive strength. Strength can be measured using the grip strength dynamometer test or the 1 Repetition Maximum (RM) test.

High maximal strength is required in **boxing** and **weightlifting**. Static strength helps **rugby players** to hold the resistance in a scrum position. **Gymnasts** need high dynamic strength.

Grip strength dynamometer test

This measures **grip strength**. Using a handgrip dynamometer in the dominant hand, squeeze the handle with maximum effort keeping the elbow at 90 degrees. Record the best score.



1 repetition maximum (1RM) test

The **1 rep max test** measures the maximal weight that can be lifted in a single attempt. Using free weights or a specialised machine, and a spotter, a participant should select a suitable weight and lift it once using the correct technique. After a few minutes rest, they should increase the weight and try again, repeating this until they reach their maximum.



The 1RM test could be used to measure the strength of various muscle groups such as the quadriceps, latissimus dorsi, pectorals or biceps using different lifting techniques.



COOL DOWNS

Cool down activities after a period of exercise should include moderate, but not intense exercise, similar to those used for warm-ups. Cooling down enables an athlete to train more frequently, to avoid injury and to achieve better results.

Benefits of cooling down

Cooling down requires maintaining an elevated breathing and heart rate by including a walk or jog, for example. Stretching allows muscles to lengthen whilst warm and then relax. A gradual reduction in intensity prevents overheating, light-headedness and nausea.

It also provides an opportunity to increase post exercise oxygen consumption and encourages blood to redistribute around the body.

Benefits of cooling down include:

- Gradually lower pulse and breathing rate to resting levels which reduces the risk of blood pooling and dizziness.
- The removal of **lactic acid**, CO₂ and waste products from the working muscles.
- **Stretching** helps return muscles to pre-exercise length, and develops flexibility.
- To reduce (delayed onset) muscle soreness (DOMS).



MOTIVATIONAL TECHNIQUES FOR FITNESS PROGRAMMING

Motivation is defined as the internal mechanisms and external stimuli that arouse and direct behaviour. It is the drive to succeed or the desire to achieve something, or to be inspired to do something. This can be intrinsic or extrinsic.

Intrinsic motivation

Intrinsic motivation comes from **within**. This can to lead to continued or sustained effort whilst training.

People are intrinsically motivated if they want to feel a sense of **pride**, **satisfaction**, **accomplishment** or **self-worth**. Achieving a personal best is an intrinsically motivated achievement.

Extrinsic motivation

Extrinsic motivation is driven by **external sources**. These can be tangible or intangible:

- Tangible factors include prizes, for example, certificates, trophies, medals or money
- **Intangible factors** include the need to perform well to receive **praise**, **feedback** or **applause**.

Striving for gold in the Olympics is an extrinsic factor in motivation

The benefits of intrinsic and extrinsic motivation on the performer

Intrinsic motivation is generally deemed more effective as it is always within you, and more likely to lead to continued or sustained effort and participation.

Performers can become over-reliant on extrinsic factors. Extrinsic rewards may result in feelings of pride and self-satisfaction, but these feelings may be short-lived. An overuse of extrinsic factors, especially if they aren't achieved, can undermine the strength of your own intrinsic motivation.

Motivation

- Increases participation
- · Maintains training and intensity
- · Leads to increased fitness
- Improves performance



Explain why someone who is new to training may find intrinsic motivation more valuable than extrinsic motivation. [2]

A beginner may make a lot of mistakes which requires internal motivation to overcome through continued practice. [1] Intrinsic motivation encourages beginners to play sport for enjoyment rather than for prizes which are less likely to come in the early stages of learning. [1] / Extrinsic motivation may fade if rewards are not gained and lead to giving up the sport. [1]

EXAMINATION PRACTICE ANSWERS

Component 3

Topic 1: The importance of fitness for sports performance

1.	(a)	B – Progressive overload.	[1]
	(b)	A – Freestyle skiing.	[1]
	(C)	Ability to make quick changes of direction.	[1]
	(d)	Flexibility. [1] Increases muscular elasticity which reduces chance of injury / decreases muscle soreness. [1] Limbs have a greater range of movement so they can reach more shots / improve their technique. [1] Flexibility improves balance and mobility, keeping the player responsive / on their feet. [1]	
		Cardiovascular endurance. [1] Increases the duration that they are able to perform at their peak for with a raised heart rate [1] Muscular endurance. [1] Avoids fatigue in muscles used repeatedly throughout a match. [1]	e.
		Speed. [1] Helps a player to reach shots on the other side of the court / aids position between shots to return to the centro of the court. [1]	re [2]
2.	(a)	A – Frequency.	[1]
	(b)	Answer may include: Weights may be increased in the gym / resistance on a rowing machine may be increased / or an incline may be introduced for runners.	[2]
	(C)	Answer should relate to sitting down / resting.	[1]
	(d)	140 BPM. (RPE x 10)	[1]
	(e)	220 – 50 = 170	[1]
	(f)	145 / 170 maximal heart rate = 85%. [1] Anaerobic zone. [1]	[2]
	(g)	Apps / smartwatch.	[1]
	(h)	Picture A – Coordination. [1] Picture B – Aerobic endurance. [1]	[2]
3.	This	s question should be marked in accordance with the levels-based mark scheme on page 59.	
	Ind	icative content:	
	Gyr a be nec	mnasts have excellent balance and flexibility. [1] Both of these skills are also essential in becoming a successful skier. [1] mnasts are likely to have strong legs from floorwork. [2] Skiers needs very strong legs [1] so this may be an advantage as eginner although more leg training may be required to advance as a skier. [1] Good coordination of the body parts is also ressary for both sports. [1] Skiers require a high degree of agility and reaction times [1] to be able to read the terrain and er obstacles and dodge them at speed. [1] Gymnasts have less need for agility. [1] Gymnasts are very powerful, [1] but it is not so often applied in skiing unless doing jumps. [1]	
		ogether, the skills required for both sports are very similar. $[\checkmark]$ As a result, it is likely that a good gymnast could successfully asfer their skills to skiing which would give them a big advantage when they first start learning. $[\checkmark]$	[6]
-	Гор	pic B Investigate fitness testing to determine fitness levels	
1.	(a)	Baseline data sets a benchmark / starting level [1] with which future test data can be compared [1] to show the rate of improvement or regression.[1]	[2]
	(b)	To design a training programme based on the test results.[1] To determine if training programmes are working.[1] So results can give a performer something to aim for.[1] To provide goal setting aims.[1]	[1]
	(c)	(i) Illinois agility run test / T test [1], (ii) agility. [1] (i) Stork stand test / Y balance test [1], (ii) balance. [1] (i) Alternate-hand wall-toss test / stick flip coordination test [1], (ii) coordination. [1] (i) Vertical jump test / standing long/broad jump / Margaria-Kalamen power test [1], (ii) power. [1] (i) Ruler drop test / online reaction time test [1], (ii) reaction time. [1]	[2]

LEVELS-BASED MARK SCHEME FOR EXTENDED RESPONSE QUESTIONS

What are extended response questions?

Extended response questions are worth six marks. These questions are likely to have command words such as 'assess' or 'evaluate'. You need to write in continuous **prose** when you answer one of these questions. This means you must write in full sentences (rather than in bullet points), organised into paragraphs if necessary.

You may need to bring together skills, knowledge and understanding from two or more areas of the specification. To gain full marks, your answer needs to be logically organised, with ideas linked to give a sustained line of reasoning.

Example level descriptors

Level descriptors vary depending on the quality of the response. Level 3 is the highest level and Level 1 is the lowest level. No marks are awarded for an answer with no relevant content. The table gives examples of the typical features that examiners are asked to look for in the six-mark questions. Once a level has been determined for an answer, an examiner will justify if the response is at the top, middle or bottom of that mark range to determine a final mark for the question.

Level	Mark	Description			
		Demonstrates mostly accurate and thorough/detailed knowledge and understanding.			
3	5-6	Most of the points made will be relevant to the context in the question, and there will be clear links.			
		Displays a well-developed and logical assessment which clearly considers the factors or events and their relative importance, leading to supported judgements.			
	3–4	Demonstrates some accurate knowledge and understanding, with only minor gaps or omissions.			
2		Some of the points made will be relevant to the context in the question, but the link will not always be clear.			
		Displays a partially developed assessment which considers some of the factors or events and their relative importance leading to partially supported judgements.			
		Demonstrates isolated knowledge and understanding, there will be major gaps or omissions.			
1	2–1	Few of the points made will be relevant to the context in the question.			
*	<i>-</i> 1	Limited assessment which contains generic assertions rather than considering the factors or events and their relative importance, leading to judgements which are superficial or unsupported.			
0	0	No rewardable content.			

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EXAMINATION TIPS

With your examination practice, use a boundary approximation using the following table. Be aware that boundaries are usually a few percentage points either side of this.

Grade	L1 Pass	L1 Merit	L1 Distinction	L2 Pass	L2 Merit	L2 Distinction
Boundary	30%	40%	50%	60%	70%	80%

- 1. Be prepared with a black pen and a ruler.
- 2. Read each question carefully. You cannot get marks for giving an answer to a question you think is appearing rather than the actual question. Avoid simply rewriting the question or repeating examples that are already given in the question.
- 3. Read the question and its stem thoroughly to ensure your answer is focused correctly.
- 4. 'Give' questions require you to recall a short piece of key information. No explanation is required. There will be one mark for each point you make.
- 5. It is better to use generic terms such as heart rate monitor or smart watch, rather than brand names such as FitBit
- 6. Where two examples are asked for, avoid giving two similar examples. For example, if you are asked to give two motivational factors, avoid giving both 'to come first', or 'to win a medal' as these relate to the same thing. Winning and pride would be a better answer as they are different examples of intrinsic and extrinsic motivational factors
- 7. Remember that 'explain' questions have two marks. You need to make a point for the first mark, and then expand this point with a linked development for the second mark. To help you develop your responses, aim to include words such as 'because' or 'so'.
- 8. Avoid undeveloped answers such as 'quick', 'simple', 'fast' and 'easy'. These cannot be awarded marks.
- 9. There are long answer questions on each paper. These are each awarded 6 marks and use the command verbs assess and evaluate. Remember that the answers to these questions need both advantages and disadvantages. An 'evaluate' question also needs a conclusion.
- 10. Be sure to learn the formulas needed to calculate the aerobic and anaerobic training zones.
- 11. Answer questions in the spaces provided. If this is not possible e.g. due to deleting a wrong answer, indicate the location of the corrected answer on the paper (e.g. 'see next page' or 'my answer is on the last blank page').
- 12. Do not use the space allocated for answers to write plans for your answers, and do not add extra pages to your answer book with plans/scribbles/items that will not be marked.

Good luck!

New titles coming soon!

Revision, re-imagined

These guides are everything you need to ace your exams and beam with pride. Each topic is laid out in a beautifully illustrated format that is accessible, approachable and as concise and simple as possible.

They have been expertly compiled and edited by subject specialists, highly experienced examiners, industry professionals and a good dollop of scientific research into what makes revision most effective. Past examination questions are essential to good preparation, improving understanding and confidence.

- Hundreds of marks worth of examination style questions
- Answers provided for all questions within the books
- Illustrated topics to improve memory and recall
- Specification references for every topic
- Examination tips and techniques
- Free Python solutions pack (CS Only)

Absolute clarity is the aim.

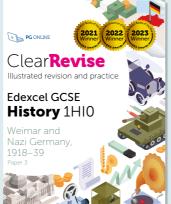
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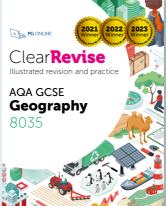
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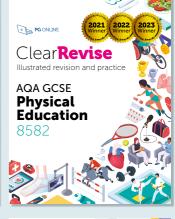


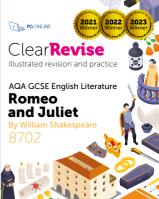




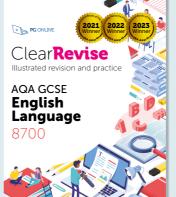












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