

TEN POINT CHALLENGE

“THE ENERGY SYSTEMS”

This challenge is pretty simple – the aim is to complete questions from one or more of the 3 categories below to the value of 10 points.

1 point questions are pretty easy, 2 point questions require more thought and 3 pointers get you thinking the most.

It’s up to you - do questions from all of the categories, or simply do them from two –
at the end 10 is your aim!

<p>1. Define what is meant by the phrase “Lactate Inflection Point”.</p> <p>2. Draw a clear diagram to show what happens when ATP is broken down and how it is rebuilt.</p> <p>3. Discuss the combined use of fats and carbohydrates as a person gradually builds up from rest to a sprint.</p> <p>4. We have access to various chemical and food fuels which are used to rebuild ATP. Complete the table below to state when the fuels would be used to provide most of the ATP/energy.</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="width: 30%; padding: 5px;">Chemical/Food Fuel</th> <th style="padding: 5px;">Situation(s) when stated fuel accounts for most ATP resynthesis</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">ATP</td> <td></td> </tr> <tr> <td style="text-align: center; padding: 5px;">PC</td> <td></td> </tr> <tr> <td style="text-align: center; padding: 5px;">Carbohydrates /Glucose</td> <td></td> </tr> <tr> <td style="text-align: center; padding: 5px;">Fats / Fatty Acids</td> <td></td> </tr> <tr> <td style="text-align: center; padding: 5px;">Proteins / Amino Acids</td> <td></td> </tr> </tbody> </table> <p>5. State and provide one point on each of the three energy system</p>	Chemical/Food Fuel	Situation(s) when stated fuel accounts for most ATP resynthesis	ATP		PC		Carbohydrates /Glucose		Fats / Fatty Acids		Proteins / Amino Acids		1 Point each
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<p>6. In the film “The Fast and the Furious” (Universal Pictures) cars accelerate quickly when a fuel known as N₂O or nitrous oxide is activated. Discuss how phosphocreatine and nitrous oxide are similar in terms of performance.</p> <p>7. a. Discuss how the use of most readily available fuels determines which energy system contributes the most to energy supply / ATP resynthesis.</p>	2 Points each												

8. When comparing energy systems it is important to know the different fuels used, how quickly they can produce energy and how much energy they can produce. Complete the following table and fill in the missing letters a – k from the options provided at the bottom of the table:

Energy System	Fuel Used	Rate	Capacity
ATP- PC	a.	c.	g.
Anaerobic Glycolysis	b.	d.	h.
Aerobic	Glucose	e.	j.
	Fatty Acids	f.	k.
Select from:	Glucose ; Creatine Phosphate	Slow; Fast; Slowest; Fastest	Biggest; Small; Smallest; Big

9. Discuss two reasons why someone running at 90% max HR would activate their aerobic energy system quicker than someone running at 70% max HR.

10. Draw a diagram that shows the process of energy being produced via the ATP-PC system. Summarize the diagram.

11. **Contrast** “aerobic glycolysis” with “anaerobic glycolysis” and discuss three differences between the two processes.

12. Cadel Evans is a superb athlete and premier cyclist. On many occasions he is called upon to sprint in the final 100-150 metres of a race often lasting longer than 2 – 2.5 hours in order to beat as many competitors over the line as possible. One of these statements is correct and you will need to complete it as a means of justifying your correct understanding of energy system contribution to this final sprint/surge.

a. “Given the final sprint is maximal, this must be predominantly powered by the ATP-PC system because....” or.....

b. “The final sprint would predominantly rely upon the aerobic energy system to produce ATP because...” or....

c. “Whilst Cadel has been cruising during the middle stages of the race he has not used his anaerobic glycolysis system and kept this in reserve until the final sprint because....”

3 Points each