

ANSWER KEY	Chapter 10 Test Answer Key	BLM 10.3.1A
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Answers to **Multiple Choice** Questions

1. b
2. a
3. c
4. d
5. b
6. a
7. d
8. c
9. b
10. a
11. b
12. d
13. d
14. c
15. c
16. d
17. d
18. b
19. a
20. c

Answers to **Numerical Response** Questions

1. 1,2, 3, 4
2. 3, 2, 1, 5, 4
3. 4, 2, 3, 1

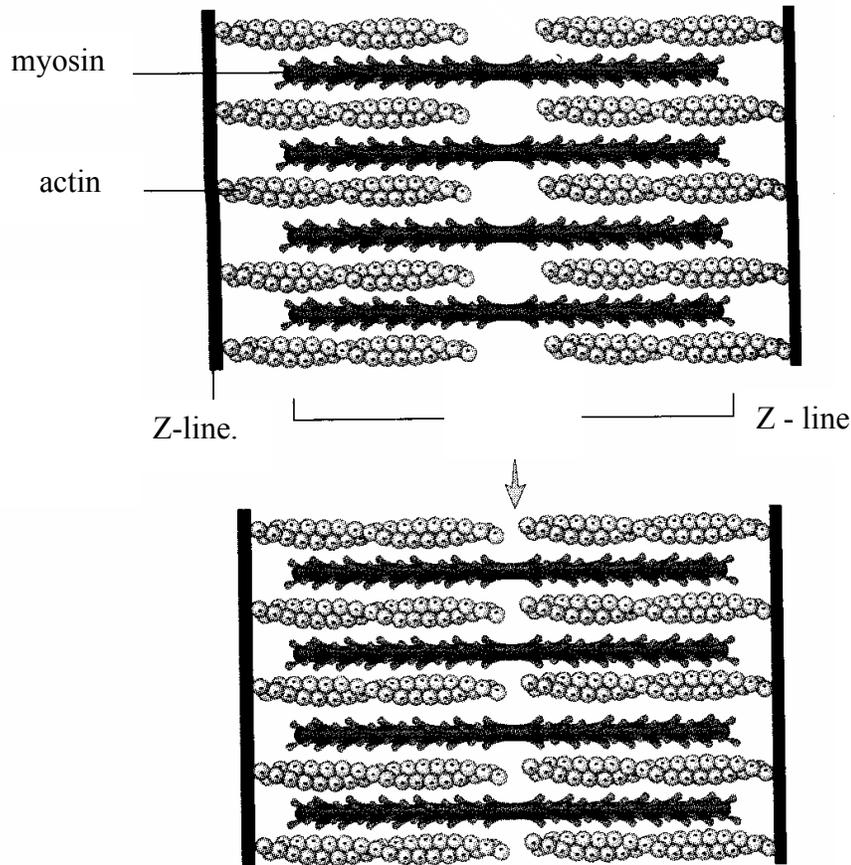
Sample Answers to **Written Response** Questions

1.
 - Aerobic cellular respiration provides most of a muscle's ATP. A muscle fibre can use glucose from glycogen and fatty acids from fats as fuel to produce ATP when oxygen is available. In the general reaction, glucose combines with oxygen to produce carbon dioxide, water, and heat. The energy transformations in this series of reactions are used to make ATP from ADP.

Myoglobin is an oxygen-carrying molecule found in muscle cells. It has a higher affinity for oxygen than hemoglobin does. Therefore, it can temporarily store oxygen and make it available to the mitochondria when cellular respiration begins.

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- Student diagrams should look similar to this illustration.



Sliding Filament Model

Muscle contractions involve the coordinated actions of the two types of myofilaments: actin and myosin. When a myofilament contracts, the heads of the myosin move first. The myosin head is attached to actin. The myosin head flexes, advancing the actin filament. The myosin head releases and unflexes. The myosin reattaches to actin farther along the fibre. The sliding of actin past myosin is part of the sliding filament model of muscle contraction.

The role that calcium ions play in the contraction of a skeletal muscle is as follows: When a muscle is relaxed, its myosin heads are raised and ready, through the splitting of ATP. The attachment sites for the myosin heads on the actin are physically blocked by a protein called tropomyosin. Calcium ions bond to a protein molecule called toponin that is part of the actin myofilament. The calcium ion/toponin complex exposes the myosin binding sites of actin. The myosin heads can bind to the actin, and contraction occurs.

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A person who has mitochondrial myopathy is not able to produce ATP (or produces little ATP). Each step in the process of a muscle contraction requires ATP to provide the energy that repositions the myosin head before each flex. Without ATP, the muscle will not be able to contract (or will contract with less force).

- Possible answers include:

Some people might only have trouble with athletic activities like jogging, while others might experience problems with everyday activities like walking to the mailbox, or lifting a milk jug. Sometimes, people with mitochondrial myopathies experience loss of muscle strength in the arms or legs, and might need braces or a wheelchair to get around. The Ptosis of the eyes can be corrected by surgery, or by using glasses that have a “ptosis crutch” to lift the upper eyelids.

Marking Guide

Score	Student Assessment Guidelines
5 Excellent	<ul style="list-style-type: none"> • constructs a diagram that clearly shows the arrangement of the myofibrils in a skeletal muscle and the shortening of the sarcomere in a muscle contraction (moving Z-lines closer together) and provides accurate labels • provides a detailed description of the sliding filament model • provides a detailed explanation of the role that calcium ions play in the contraction of a skeletal muscle • provides a clear description of how mitochondrial myopathy could disrupt the contraction of the muscle
4 Good	<ul style="list-style-type: none"> • constructs a diagram that shows the arrangement of the myofibrils but the diagram may not be complete or has minor errors • provides a description of the sliding filament model • provides an explanation of the role that calcium ions play in the contraction of a skeletal muscle • provides a description of how mitochondrial myopathy could disrupt the contraction of a muscle
3 Satisfactory	<ul style="list-style-type: none"> • constructs the diagram showing the arrangement of the myofibrils but does not include the second part showing how the Z-lines are pulled closer together or is not properly labelled • partially describes the sliding filament model • partially explains the role that calcium ions play in the contraction of a skeletal muscle
2 Limited	<ul style="list-style-type: none"> • makes a limited attempt at the diagram • provides a limited description of the sliding filament model • provides a limited description of the role that calcium ions play
1 Poor	<ul style="list-style-type: none"> • addresses only two of the bullets at a 2 or a 3 level

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0 Insufficient	<ul style="list-style-type: none"> does not address the question or provides an answer that is too brief to assess
NR	<ul style="list-style-type: none"> does not provide a response

Technology and Society

Score	Student Assessment Guidelines
5 Excellent	<ul style="list-style-type: none"> provides very clear, accurate, and detailed impact on the lives of people suffering from mitochondrial myopathy identifies two technologies and links these directly to the impacts identified
4 Good	<ul style="list-style-type: none"> provides accurate and detailed impact on the lives of the people suffering from mitochondrial myopathy identifies two technologies that are not necessarily linked to the impacts identified
3 Satisfactory	<ul style="list-style-type: none"> identifies the impacts on the lives of the people suffering from mitochondrial myopathy but does not provide the detail required identifies one technology that may or may not be linked directly to the impacts identified
2 Limited	<ul style="list-style-type: none"> only identifies one impact on the lives of the individuals and does not provide detail identifies one technology but does not provide any detail; makes no attempt to link it directly to the impact identified
1 Poor	<ul style="list-style-type: none"> addresses only two of the bullets at a 2 or a 3 level
0 Insufficient	<ul style="list-style-type: none"> does not address the question or provides an answer that is too brief to assess
NR	<ul style="list-style-type: none"> does not provide a response