

KIPP/2025/_____

Review of Metabolism**Directions:** Answer the questions below to refresh yourself on key concepts from our first unit.**Chapter 1**

1. What are the three molecules necessary for cellular function?

- _____
- _____
- _____

2. What are the two places where cells get these molecules from?

- _____
- _____

Chapter 2

3. What does protein break down into?

- _____

4. What does starch break down into?

- _____

5. What does oxygen break down into?

- _____

6. Which body system is responsible for bringing oxygen in from the atmosphere?

- _____

7. Which body system is responsible for breaking down starch and protein?

- _____

8. Which body system is responsible for transporting molecules to our cells?

- _____

9. What condition makes it difficult for cells to get oxygen because of a shortage of red blood cells?

- _____

10. What condition makes it difficult for cells to get glucose and amino acids because of problems with the digestive system not breaking down food into small enough molecules?

- _____

11. What condition makes it difficult for cells to get glucose because of a lack of insulin production to unlock the cell membrane to let glucose inside?

- _____

12. What conditions make it difficult for cells to get oxygen due to tubes in the lungs squeezing shut?

- _____

Chapter 3

13. What two molecules do cells need to release energy?
● _____
14. What chemical reaction rearranges glucose and oxygen to release energy?
● _____
15. What molecule can cells combine to form protein to grow and repair itself?
● _____
16. What illegal process do some athletes undergo to increase the number of red blood cells in their body for cellular respiration by injecting old/stored blood back into their body just before a competition?
● _____

Chapter 4

17. What is a fair alternative to the process mentioned in question 16 that athletes could do to increase the number of red blood cells in their body for cellular respiration? This process would require working out in the elevated mountains which causes their red blood cells to expand so that they can carry more oxygen?
● _____
18. What molecule that is needed for cellular respiration can be increased by a change to an athletes diet?
● _____

Practice Problems

1. The space exploration program has hired you for advice on how to keep astronauts healthy in the space shuttle. How can the program's doctors make sure the astronauts' bodies work well enough to exercise in space?
- (a) The doctors could make sure that the astronauts' bodies can make enough energy by getting enough sleep.
 - (b) The doctors could make sure the astronauts' stomachs are getting the molecules they need from food and air.
 - (c) The doctors could make sure the astronauts' cells are getting the molecules they need from food and air.
 - (d) The doctors could make sure the astronauts' cells are getting different types of molecules from food.

2. Some types of syrup are almost entirely made of glucose molecules. If a person ate some syrup like this, what would happen to her ability to exercise?

- (a) It would be harder for her to exercise because her digestive system would need to use more enzymes to combine the glucose molecules together.
- (b) It would be easier for her to exercise because glucose moves through the circulatory system faster than other food molecules usually do.
- (c) Nothing would happen to her ability to exercise, but her respiratory system would not work as hard, since glucose has more energy than oxygen molecules.
- (d) Nothing would happen to her ability to exercise, but her digestive system would not work as hard, since glucose is already small enough to get to her cells.

3. Doctors tested a patient and found that his cells contained normal levels of oxygen and glucose molecules, and no starch molecules. Will this patient be able to exercise normally?

- (a) Yes, the glucose and oxygen molecules can react together to release energy for the body to function.
- (b) No, his digestive system is not breaking down food molecules; his cells need starch molecules to react with glucose, which releases energy.
- (c) No, his body systems are working, but he needs to eat different food; in cells, only amino acids can react with oxygen to release energy.
- (d) Yes, as long as his cells have glucose, they don't need anything else to release energy for the body to function.

4. Some problems with the digestive system make it very difficult for the body to digest enough food. Why would it be harder to exercise when you have a digestion problem like this?

- (a) You would not be able to sleep, which would make you too tired to exercise.
- (b) Your cells would have molecules from air, but would not get enough molecules from food.
- (c) You would need to breathe in a lot more air because your body would have fewer molecules from food.
- (d) You would not get any of the molecules your cells need to exercise.

Test Report: R. Garcia

Body Part and System	Test Results
Mouth (digestive system)	starch molecules: high oxygen molecules: normal glucose molecules: low
Small intestine (digestive system)	starch molecules: high oxygen molecules: none glucose molecules: low
Lungs (respiratory system)	starch molecules: none oxygen molecules: normal glucose molecules: none

5. The test report above shows the level of molecules in different parts of the patient's body. How would you expect this patient to do on an exercise test?

- (a) Well; his body is working properly.
- (b) Poorly; his digestive system is not combining glucose molecules together for the cells to use.
- (c) Poorly; his digestive system is not breaking down molecules from food into glucose.
- (d) Poorly; his respiratory system is not breaking down oxygen molecules into glucose.