1. ________________ the amount of energy needed to raise the temperature of water 1 degree Celsius

2. ________________ the process by which cells release energy in the absence of oxygen

3. ________________ occurring in the absence of oxygen

4. ________________ A series of carrier proteins in a mitochondrion

5. ________________ pyruvic acid being broken down into carbon dioxide in a series of energy-extracting reactions.

6. ________________ A high level of lactic acid in the blood is a sign that this type of fermentation has occurred.

Refer to the following pathways for the questions:

Pathway A  Glucose → Pyruvic Acid → Lactic acid + 2 ATP
Pathway B  Glucose → Pyruvic Acid → Carbon Dioxide + Ethyl Alcohol + 2 ATP
Pathway C  Glucose → Pyruvic Acid → Carbon Dioxide + Water + 2 ATP

7. ________________ Pathway B shows what kind of fermentation?

8. ________________ Give the letter for the pathway that requires oxygen

9. ________________ Based on the pathways, how many ATP molecules are formed by fermentation?

10. ________________ give the name for pathway C
11. ________ Which of the following is NOT a stage of cellular respiration?
   a. Fermentation        c. glycolysis
   b. Electron transport  d. Krebs cycle

12. ________ What are the reactants in the equation for cellular respiration?
   a. Oxygen and lactic acid   c. glucose and oxygen
   b. Carbon dioxide and water d. water and glucose

13. ________ The starting molecule for glycolysis is
   a. ADP                        c. citric acid
   b. pyruvic acid               d. glucose

14. ________ One cause of muscle soreness is
   a. Alcohol fermentation      c. lactic acid fermentation
   b. Glycolysis                d. the Krebs cycle

15. ________ Which process is used to produce wine and beer?
   a. Lactic acid fermentation  c. alcohol fermentation
   b. Glycolysis               d. the Krebs cycle

16. ________ The conversion of pyruvic acid into lactic acid requires
   a. Alcohol                  c. ATP
   b. Oxygen                   d. NADH

17. ________ Which organism is NOT likely to carry out cellular respiration?
   a. Tree                     c. anaerobic bacterium
   b. Mushroom                 d. tiger

18. ________ During one turn, the Krebs cycle produces
   a. Oxygen                   c. electron carriers
   b. Lactic acid              d. glucose

19. ________ Which of the following passes high-energy electrons into the electron transport chain?
   a. NADH and FADH$_2$        c. citric acid
   b. ATP and ADP              d. acetyl-CoA

20. ________ Cellular respiration uses one molecule of glucose to produce
   a. 2 ATP molecules          c. 36 ATP molecules
   b. 34 ATP molecules         d. 38 ATP molecules
21. ________ Breathing heavily after running a race is your body’s way of
   a. making more citric acid    c. restarting glycolysis
   b. repaying an oxygen debt    d. recharging the electron transport chain

22. ________ All of the following are sources of energy during exercise EXCEPT
   a. stored ATP          c. lactic acid fermentation
   b. alcoholic fermentation d. cellular respiration

23. ________ Which process does NOT release energy from glucose?
   a. Glycolysis          c. fermentation
   b. Photosynthesis     d. cellular respiration

24. ________ Photosynthesis is to chloroplast as cellular respiration is to
   a. Chloroplast       c. mitochondria
   b. Cytoplasm        d. nucleus

25. ________ Plants cannot release energy from glucose using
   a. Glycolysis          c. the Kreb’s cycle
   b. Photosynthesis     d. cellular respiration

26. ________ Which of the following is released during cellular respiration?
   a. Oxygen            c. energy
   b. Air            d. lactic acid

27. ________ Which of these is a product of cellular respiration?
   a. Oxygen          c. glucose
   b. Water          d. all of the above

28. ________ Which of these processes takes place in the cytoplasm of a cell?
   a. Glycolysis       c. Krebs cycle
   b. Electron transport d. all of the above

29. ________ Lactic Acid fermentation occurs in
   a. bread dough
   b. any environment containing oxygen
   c. muscle cells
   d. mitochondria

30. ________ The two main types of fermentation are called
   a. alcoholic and aerobic   c. alcoholic and lactic acid
   b. aerobic and anaerobic d. lactic acid and anaerobic
31. In the presence of oxygen, glycolysis is followed by
   a. lactic acid fermentation  c. photosynthesis
   b. alcoholic fermentation  d. the Krebs cycle

32. Cellular respiration is called an aerobic process because it requires
   a. light  c. oxygen
   b. exercise  d. glucose

33. The starting molecule for the Krebs cycle is
   c. glucose  c. pyruvic acid
   d. NADH  d. coenzyme A

34. In eukaryotes, electron transport occurs in the
   a. Mitochondria  c. cell membrane
   b. Chloroplasts  d. cytoplasm

35. The energy of the electrons passing along the electron transport chain is used to make
   a. Lactic acid  c. alcohol
   b. Citric acid  d. ATP

36. When the body needs to exercise for longer than 90 seconds, it generates ATP by carrying out
   a. Lactic acid fermentation  c. cellular respiration
   b. Alcoholic fermentation  d. glycolysis

37. Unlike photosynthesis, cellular respiration occurs in
   a. Animal cells only  c. all but plant cells
   b. Plant cells only  d. all eukaryotic cells

38. The products of photosynthesis are the
   a. Products of cellular respiration
   b. Reactants of cellular respiration
   c. Products of glycolysis
   d. Reactants of fermentation
39. List the three main stages of cellular respiration in order. Next to each stage write the location and if it is aerobic or anaerobic.

40. Identify the electron carriers of cellular respiration. Discuss the relationship between the electron carriers and the electron transport chain.

41. Why is the Krebs cycle also known as the citric acid cycle?

42. What is the main function of the electron transport chain?
1. Calorie
2. Fermentation
3. Anaerobic
4. Electron Transport Chain
5. Krebs Cycle (citric acid cycle)
6. Lactic Acid Fermentation
7. Alcohol Fermentation
8. Pathway C
9. 2
10. Cellular Respiration
11. A. fermentation
12. C. glucose and oxygen
13. D. glucose
14. C. lactic acid fermentation
15. C. alcohol fermentation
16. D. NADH
17. C. anaerobic bacterium
18. C. electron carriers
19. A. NADH and FADH2
20. C. 36 ATP molecules
21. B. repaying an oxygen debt
22. B. alcoholic fermentation
23. B. photosynthesis
24. C. mitochondria
25. B. photosynthesis
26. C. energy
27. B. water
28. A. glycolysis
29. C. muscle cells
30. C. alcoholic and lactic acid
31. D. the Krebs cycle
32. C. oxygen
33. C. pyruvic acid
34. A. mitochondria
35. D. ATP
36. A. lactic acid fermentation
37. D. all eukaryotic cells
38. B. reactants of cellular respiration
39. Glycolysis Cytoplasm Anaerobic
   Krebs Cycle Mitochondrial Matrix Aerobic
   Electron Transport Chain Mitochondrial Cristae Aerobic
40. The electron carriers of cellular respiration are NAD+ and FAD. These molecules accept high-energy electrons and move to the electron transport chain. The electron transport chain produces ATP molecules.
41. Citric Acid is the first compound formed in the process
42. The electron transport chain uses high-energy electrons from the Krebs cycle to convert ADP into ATP.