Name _____ Class_____Date_____

Section 1: Chemical Energy and ATP

Study Guide B

KEY CONCEPT

All cells need chemical energy.

VOCABULARY

ATP	ADP	chemosynthesis

MAIN IDEA: The chemical energy used for most cell processes is carried by ATP.

1. What do all cells use for energy?

_____

2. What is ATP?

_____

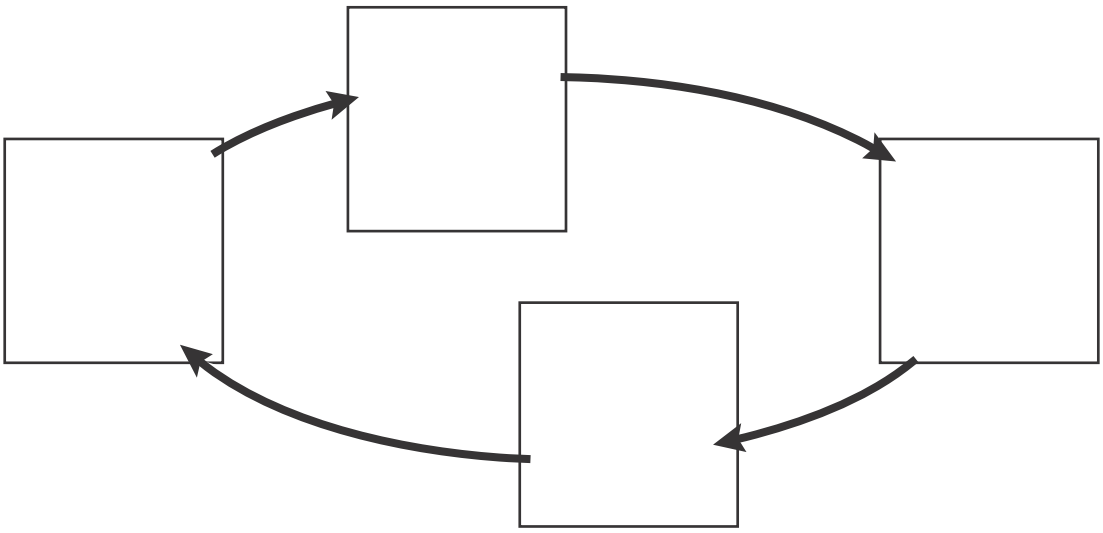
_____

3. What is the relationship between ATP and ADP?

_____

_____

Fill in the four parts of the cycle diagram below to take notes on the relationship between ATP and ADP.



MAIN IDEA: Organisms break down carbon-based molecules to produce ATP.

Use the table below to organize your notes about the different types of molecules that are broken down to make ATP.

Type of Molecule	Role in ATP Production
Carbohydrates	4.
Lipids	5.
Proteins	6.

MAIN IDEA: A few types of organisms do not need sunlight and photosynthesis as a source of energy.

7. What is chemosynthesis?

_____

_____

Vocabulary Check

8. The prefix *tri-* means “three,” and the prefix *di-* means “two.” How do these pref ixes tell you the difference between adenosine triphosphate (ATP) and adenosine diphosphate (ADP)?

_____

9. The prefix *chemo-* means “chemical,” and *synthesis* comes from a Greek word that means “to put together.” How do these meanings tell you what chemosynthesis does?

_____

_____

Name _____ Class_____Date_____

Section 2: Overview of Photosynthesis

Study Guide B

KEY CONCEPT

The overall process of photosynthesis produces sugars that store chemical energy.

VOCABULARY

photosynthesis	light-dependent reactions	thylakoid
chlorophyll	light-independent reactions	

MAIN IDEA: Photosynthetic organisms are producers.

1. Why are some organisms called producers?

_____

2. What is the function of photosynthesis?

_____

3. What is chlorophyll?

_____

MAIN IDEA: Photosynthesis in plants occurs in chloroplasts.

4. What are chloroplasts?

_____

5. In which two parts of a chloroplast does photosynthesis take place?

_____

6. What are thylakoids?

_____

7. Write the chemical equation for the overall process of photosynthesis. Then explain what the equation means and identify the reactants, products, and the meaning of the several arrows.

_____

_____

8. What are the differences between the light-dependent reactions and the light-independent reactions?

_____

_____

Use the space below to sketch and label a chloroplast. On the sketch, write the four steps of the photosynthesis process.

Photosynthesis

Vocabulary Check

9. The prefix *photo-* means “light,” and synthesis means “to put together.” How do those meanings tell you what happens during photosynthesis?

_____

10. The prefix *chloro-* means “green,” and the suffix *-phyll* means “leaf.” How are these meanings related to chlorophyll?

_____

11. The prefix *in-* means “not.” How does this meaning tell you which reactions in photosynthesis require light, and which reactions do not?

_____

_____

Name _____ Class_____Date_____

Section 3: Photosynthesis in Detail

Study Guide B

KEY CONCEPT

Photosynthesis requires a series of chemical reactions.

VOCABULARY

photosystem	ATP synthase
electron transport chain	Calvin cycle

MAIN IDEA: The first stage of photosynthesis captures and transfers energy.

1. Overall, what is the function of the light-dependent reactions?

_____

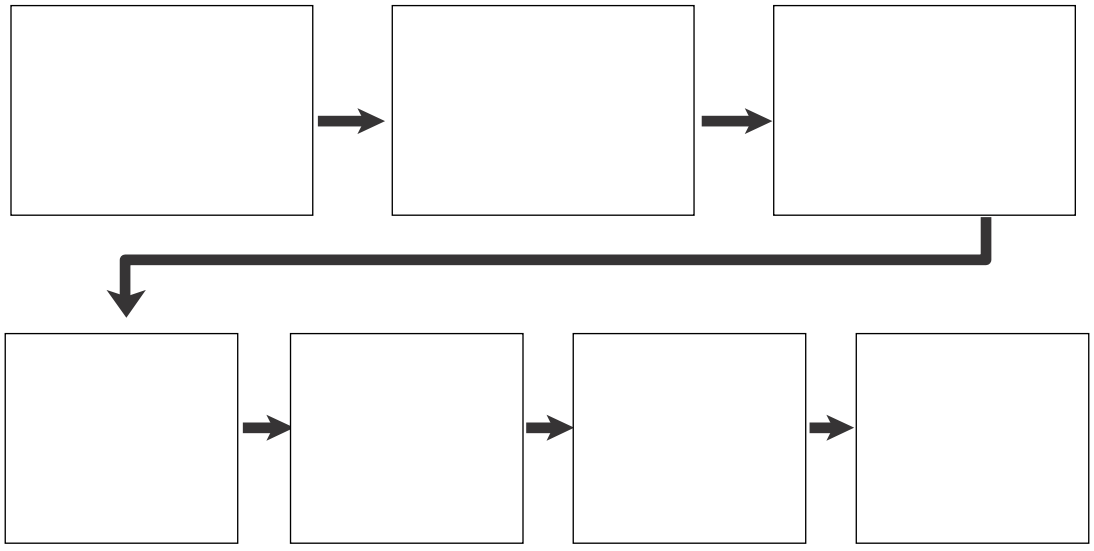
2. What are photosystems?

_____

3. Which molecules carry energy to the light-independent reactions?

_____

Fill in the sequence diagram below to follow the seven steps of the light-dependent reactions.

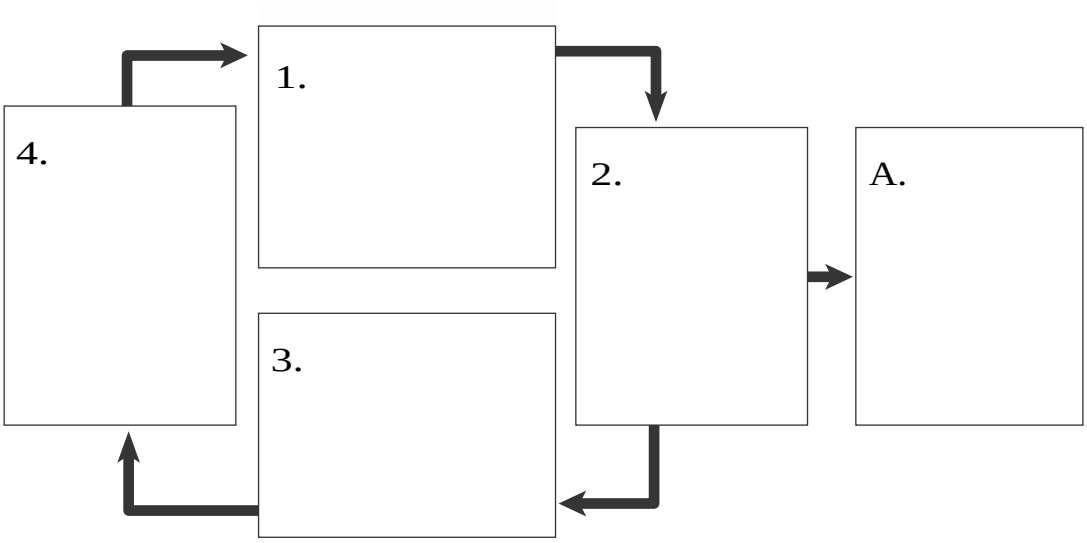


MAIN IDEA: The second stage of photosynthesis uses energy from the first stage to make sugars.

4. What is the function of the Calvin cycle?

_____

Fill in the cycle diagram to summarize the four steps of the Calvin cycle.



Vocabulary Check

5. What is the electron transport chain?

_____

6. The first part of an enzyme's name tells you about its function. All enzymes end with the suffix *-ase*. What does this information tell you about ATP synthase?

_____

7. What does the word *cycle* tell you about the chemical reactions of the Calvin cycle?

_____

Name _____ Class_____Date_____

Section 4: Overview of Cellular Respiration

Study Guide B

KEY CONCEPT

The overall process of cellular respiration converts sugar into ATP using oxygen.

VOCABULARY

cellular respiration	anaerobic
aerobic	Krebs cycle
glycolysis	

MAIN IDEA: Cellular respiration makes ATP by breaking down sugars.

1. What is cellular respiration?

_____

2. Why is cellular respiration called an aerobic process?

_____

3. Where does cellular respiration take place?

_____

4. What happens during glycolysis?

_____

MAIN IDEA: Cellular respiration is like a mirror image of photosynthesis.

5. In what two ways does cellular respiration seem to be the opposite of photosynthesis?

_____

_____

6. In which two parts of a mitochondrion does cellular respiration take place?

_____

7. Write the chemical equation for the overall process of cellular respiration.

_____

8. Explain what the equation means. Identify the reactants, products, and the meaning of the several arrows.

_____

_____

Use the space below to sketch and label a mitochondrion. On the sketch, write the four steps of the cellular respiration process that occur in the mitochondrion.

Cellular Respiration

Vocabulary Check

9. The prefix *glyco-* comes from a Greek word that means "sweet." The suffix *-lysis* comes from a Greek word that means "to loosen." How are the meanings of these word parts related to the meaning of *glycolysis*?

_____

_____

10. What does it mean to say that glycolysis is an anaerobic process?

_____

11. What is the Krebs cycle?

_____

_____

Name _____ Class_____Date_____

Section 5: Cellular Respiration in Detail

Study Guide B

KEY CONCEPT

Cellular respiration is an aerobic process with two main stages.

MAIN IDEA: Glycolysis is needed for cellular respiration.

1. What is the function of glycolysis?

_____

2. What happens to the molecules formed during glycolysis when oxygen is available?

_____

3. What is meant by a "net gain of two ATP molecules" from glycolysis?

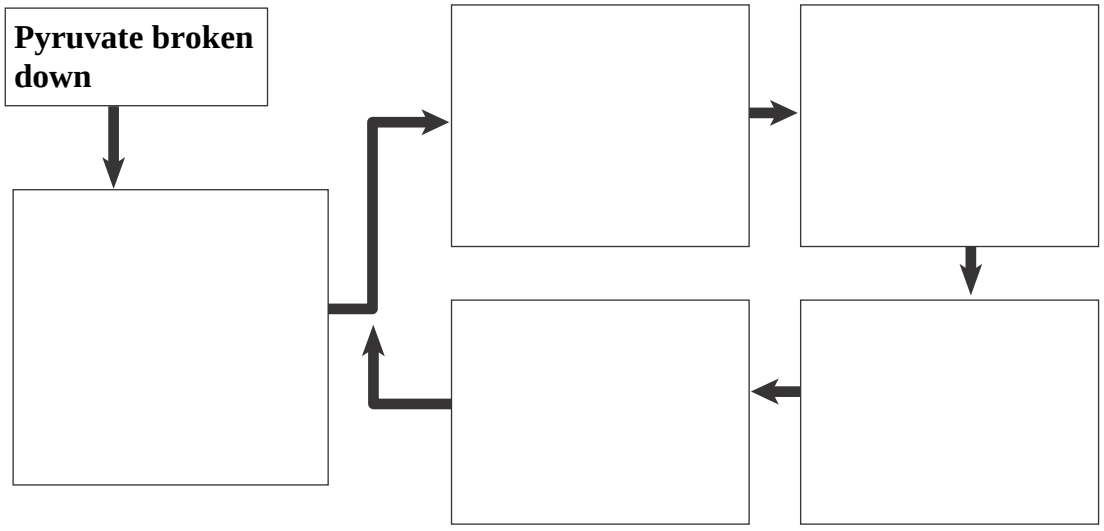
_____

MAIN IDEA: The Krebs cycle is the first main part of cellular respiration.

4. What is the function of the Krebs cycle?

_____

Complete the cycle diagram below to summarize the six steps of the Krebs cycle



MAIN IDEA: The electron transport chain is the second main part of cellular respiration.

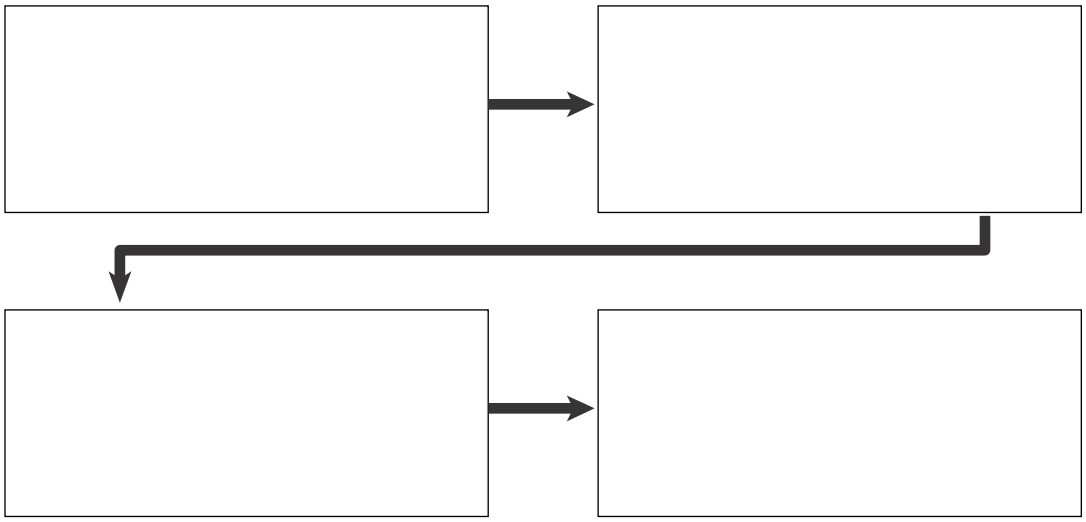
5. Where is the electron transport chain in cellular respiration located?

_____

6. What is the function of the electron transport chain?

_____

Fill in the sequence below to take notes on the four steps of the electron transport chain.



7. Why is oxygen needed for cellular respiration?

_____

_____

_____

Name _____ Class_____Date_____

Section 6: Fermentation

Study Guide B

KEY CONCEPT

Fermentation allows the production of a small amount of ATP without oxygen.

VOCABULARY

fermentation
lactic acid

MAIN IDEA: Fermentation allows glycolysis to continue.

1. What is the importance of fermentation?

_____

2. What is the function of fermentation?

_____

3. When does fermentation take place in your muscle cells?

_____

4. Why is fermentation an anaerobic process?

_____

5. How is fermentation involved in the production of ATP?

_____

In the space below, show and label the process of lactic acid fermentation.

Lactic Acid Fermentation

MAIN IDEA: Fermentation and its products are important in several ways.

In the space below, show and label the process of alcoholic fermentation.

Alcoholic Fermentation

6. How are lactic acid fermentation and alcoholic fermentation similar? different?

_____

_____

_____

7. Name one commercial use of lactic acid fermentation.

_____

8. Name one commercial use of alcoholic fermentation.

_____

Vocabulary Check

9. The term *fermentation* is based on a word that means "to bubble." How is this meaning related to your understanding of the fermentation process?

_____

10. What is lactic acid?

_____