<table>
<thead>
<tr>
<th>Key Vocabulary Word</th>
<th>Textbook Definition</th>
<th>Your Definition</th>
<th>Comic/Drawing or Root Words</th>
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<tbody>
<tr>
<td><strong>Section 4.1: Chemical Energy and ATP</strong></td>
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<tr>
<td>ATP (Adenosine triphosphate)</td>
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<tr>
<td>ADP (Adenosine diphosphate)</td>
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<tr>
<td>Chemosynthesis</td>
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<tr>
<td><strong>Section 4.2: Overview of Photosynthesis</strong></td>
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<tr>
<td>Photosynthesis</td>
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<tr>
<td>Chlorophyll</td>
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<tr>
<td>Thylakoid</td>
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<tr>
<td>Light-dependent reactions</td>
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<tr>
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**B2.5d** Describe how individual cells break down energy-rich molecules to provide energy for cell functions

**B3.1f** Summarize the process of photosynthesis

**B3.1b** Illustrate and describe the energy conversions that occur during photosynthesis and respiration

**B3.1c** Recognize the equations for photosynthesis and respiration and identify the reactants and products for both.
4.1: Chemical Energy and ATP

1. What do all cells use for energy?

____________________________________________________________________
____________________________________________________________________

2) What is the relationship between ATP and ADP? How do the prefixes “tri” and “di” help distinguish between the two?

____________________________________________________________________
____________________________________________________________________

3) Fill in the four parts of the cycle diagram below to take notes on the relationship between ATP and ADP. Be sure to draw and label each element. Include when phosphates are added or removed.

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

<table>
<thead>
<tr>
<th>Type of Molecule</th>
<th>Role in ATP Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrates</td>
<td></td>
</tr>
<tr>
<td>Lipids</td>
<td></td>
</tr>
<tr>
<td>Proteins</td>
<td></td>
</tr>
</tbody>
</table>
Key Concepts: Below each key concept, write it in your own words

5) All cells need chemical energy.

6) The chemical energy used for most cell processes is carried by ATP.

7) Organisms break down carbon-based molecules to produce ATP.

8) A few types of organisms do not need sunlight and photosynthesis as a source of energy.

4.2: Overview of Photosynthesis

9) Why are some organisms called producers?

10) What is the function of photosynthesis?

11) What are chloroplasts?

12) In which two parts of a chloroplast does photosynthesis take place?

13) What are thylakoids?

14) 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.
15) What are three differences between the light-dependent reactions and the light-independent reactions?

a) _______________________________________________________________________

b) _______________________________________________________________________

c) _______________________________________________________________________

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

---

Key Concepts: Below each key concept, write it in your own words

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

18) Photosynthetic organisms are producers.  
__________________________________________  
__________________________________________  

19) Photosynthesis in plants occurs in chloroplasts.  
__________________________________________  
__________________________________________  

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### Key Vocabulary Word

<table>
<thead>
<tr>
<th>Section 4.4: Overview of Cellular Respiration</th>
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<tbody>
<tr>
<td><strong>Cellular respiration</strong></td>
</tr>
<tr>
<td>Aerobic</td>
</tr>
<tr>
<td>Glycolysis</td>
</tr>
<tr>
<td>Anaerobic</td>
</tr>
<tr>
<td>Krebs cycle</td>
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</tbody>
</table>

### Section 4.6: Fermentation

<table>
<thead>
<tr>
<th><strong>Fermentation</strong></th>
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</thead>
<tbody>
<tr>
<td>Lactic acid</td>
</tr>
</tbody>
</table>

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**B2.5e** Explain the interrelated nature of photosynthesis and cellular respiration in terms of ATP synthesis and degradation.

**B2.4e** Explain how cellular respiration is important for the production of ATP (build on aerobic and anaerobic)

**B3.1b** Illustrate and describe the energy conversions that occur during photosynthesis and respiration

**B3.1c** Recognize the equations for photosynthesis and respiration and identify the reactants and products for both.
4.4: Overview of Cellular Respiration

20) Why is cellular respiration called an aerobic process?

______________________________________________________________________
______________________________________________________________________

21) Where does cellular respiration take place?

______________________________________________________________________

22) What happens during glycolysis?

______________________________________________________________________

23) In what two ways does cellular respiration seem to be the opposite of photosynthesis?

______________________________________________________________________

24) In which two parts of a mitochondrion does cellular respiration take place?
   a) ______________________________________________________________________
   b) ______________________________________________________________________

25) Write the chemical equation for the overall process of cellular respiration. Explain what the equation means. Identify the reactants, products, and the meaning of the several arrows.

______________________________________________________________________

26) 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.
Key Concepts: Below each key concept, write it in your own words

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

______________________________________________________________________
______________________________________________________________________

28) Cellular respiration makes ATP by breaking down sugars.

______________________________________________________________________
______________________________________________________________________

29) Cellular respiration is like a mirror image of photosynthesis.

______________________________________________________________________

4.6: Fermentation

30) What is the importance of fermentation?

______________________________________________________________________
______________________________________________________________________

31) What is the function of fermentation?

______________________________________________________________________
______________________________________________________________________

32) When does fermentation take place in your muscle cells?

______________________________________________________________________
______________________________________________________________________

33) Why is fermentation an anaerobic process?

______________________________________________________________________
34) In the spaces below, show and label the process of lactic acid fermentation and alcoholic fermentation.

<table>
<thead>
<tr>
<th>Lactic Acid Fermentation</th>
<th>Alcoholic Fermentation</th>
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</tbody>
</table>

35) How do these two types differ? How are they similar?

______________________________________________________________________
______________________________________________________________________

**Key Concepts:** *Below each key concept, write it in your own words*

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

37) Fermentation allows glycolysis to continue.
______________________________________________________________________
______________________________________________________________________

38) Fermentation and its products are important in several ways.
______________________________________________________________________
______________________________________________________________________
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<tbody>
<tr>
<td><strong>Blade</strong></td>
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<tr>
<td><strong>Petiole</strong></td>
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<td></td>
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<tr>
<td><strong>Mesophyll</strong></td>
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<tr>
<td><strong>Guard Cell</strong></td>
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**Section 21.4: Leaves**

**B2.5f** Relate plant structures and functions to the process of photosynthesis and respiration.

**21.4: Leaves**

39) Sketch a leaf attached to a stem. Label the blade, petiole, stem, and axillary bud.
40) Use a sequence diagram to fill in the steps describing how stomata regulate gas exchange.

During the day stomata are _________________.

__________________________ enters.

occurs.

__________________________ in leaves overtakes water absorption in roots.

__________________________ close the stomata.

Low ____________________ will slow photosynthesis.

41) What are three leaf characteristics that can be used for plant identification?

________________________________________________________________________

________________________________________________________________________

42) How can you tell the difference between a leaf and a leaflet?

________________________________________________________________________

________________________________________________________________________

43) What is the photosynthetic tissue of a leaf?

________________________________________________________________________
44) Use the following terms and stack them like you were building a sandwich in the order they are found within a leaf: mesophyll, dermal tissue, dermal tissue, cuticle, cuticle.

45) What are three adaptations of plants that help reduce water loss in a desert or cold environment?
   a) ______________________________________________________________________
   b) ______________________________________________________________________
   c) ______________________________________________________________________

46) How are the two types of mesophyll found in a leaf specialized for photosynthesis?

____________________________________________________________________
____________________________________________________________________

Key Concepts: Below each key concept, write it in your own words

47) Leaves absorb light and carry out photosynthesis.

____________________________________________________________________
____________________________________________________________________

48) Most leaves share some similar structures.

____________________________________________________________________
____________________________________________________________________

49) Most leaves are specialized structures for photosynthesis.

____________________________________________________________________
____________________________________________________________________