biology

module: Cells and Cell Processes
unit: Cells and Energy

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TEKS

4B Investigate and explain cellular processes, including homeostasis, energy conversions, transport of molecules, and synthesis of new molecules

9A Compare the structures and functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids

9B Compare the reactants and products of photosynthesis and cellular respiration in terms of energy and matter

instructional content:

- Chemical energy and ATP
  - Storing energy in ADP
  - Releasing energy in ATP
- Photosynthesis
  - Structure of chloroplast
  - Light-dependent reactions
  - Light-independent reactions
- Cellular respiration
  - Structure of mitochondria
  - Stages of cellular respiration: glycolysis, Krebs cycle, electron transport chain
- Fermentation
  - Lactic acid
  - Alcoholic

learning outcomes students will:

- Use all content and scientific process skills learned earlier in the course
- Explain what ATP is and what its role is within the cell
- Give examples of cellular activity that involves ATP
- Describe how ADP and ATP are related
- Compare and contrast the energy needs of plant and animal cells
- Describe the role of chloroplasts in photosynthesis
- Describe the relationship between chlorophyll and the color of plants
- Describe the role of chlorophyll a and b, and accessory pigments in light capture
- Identify the structures within the chloroplast and state their role in photosynthesis
- Summarize the stages of the light-dependent reactions
- Identify the location of the light-dependent reactions
- Summarize the stages of the light-independent reactions
- Identify the location of the light-independent reactions
- Name the reactants and products of photosynthesis
- Write the balanced chemical reaction of photosynthesis
- Describe the role of mitochondria in cellular respiration
- Identify the structures within the mitochondria and state their role in cellular respiration
- Summarize the process of glycolysis
- State the net yield of ATP from glycolysis
- Summarize the stages of aerobic cellular respiration including the Krebs cycle and electron transport chain
- State the net yield of ATP from aerobic cellular respiration
- Name the reactants and products of cellular respiration
- Write the balanced chemical reaction of cellular respiration
- Describe the relationship between photosynthesis and cellular respiration
- Name the two main types of fermentation and identify where each occurs
- Describe the relationship between glycolysis and fermentation
- Compare aerobic cellular respiration to fermentation in terms of net yield of ATP

Incorporate scientific process skills during the instruction of all Biology concepts.
Look for this icon at wardsci.com/TEKS for more information on scientific process skills.

Recommended Ward's Science products with item numbers for easy online searching:

science tools:

Elodea densa **867503**
Ward's DataHub: Biology/Chemistry **9200503**
Vernier BioChamber **145161**
Pyrex® Test Tubes with Rims **170630**
VWR® Standard-Grade Beakers **173500**
Borosilicate Glass, Single Scale Graduated Cylinders with Plastic Base **6136002**
Bromothymol Blue Indicator Solution **9446700**
Fermentation Tubes **173200**

instructional resources:

Interactive Whiteboard Science Lesson CD: Photosynthesis & Respiration **745282**
Photosynthesis Made Easy Manipulatives **6934400**
Cellular Respiration & Photosynthesis Manipulative Model **4606300**
Organelles Lab Activity **363505**
Ward's Photosynthesis Demonstration Model **148312**
Photosynthesis & Cellular Respiration Activity **366070**
Ward's Photosynthesis and Respiration Lab Activity **368002**
Ward's Fermentation Kit **853990**
Respiration of Yeast Lab Activity - A Student Designed Experiment **4697100**
Science Take-Out Experiments: Just Add Students! **367335**

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