

Exam Preparation for Science and Social Studies Program

EXPreSS

June 8 through June 19
2009

TEACHER

Friday, June 12

Objective

Domain: Cells and Heredity

- Students differentiate how organisms from different kingdoms obtain, transform, and transport, energy and/or material.
- Students understand the relationships between single-celled and multi-celled organisms, on a broad, conceptual level.

Time	Activity/Task	Assessment
15 min	<p><i>Warm-up Activity</i> Review the basic requirements that all living things share and explain that most of them will be directly or indirectly related to an organism's need for energy. Divide students into groups of four. Give each group a sheet of chart paper and a marker. Ask the group to discuss what they know about the properties of water and write these on their chart paper. Reassemble as a whole group and share each group's understandings. <i>Teacher Note:</i> The purpose of this activity is to pre-assess student knowledge and to identify misconceptions.</p>	Group charts and participation in the group discussion.
15 min	<p><i>Water and Life</i> Watch the video segments Why Is Water Essential to Life on Earth? and Water and Plants: A Unique Relationship from Unitedstreaming. Ask the students to complete the Water and Life video reflection handout. (See Water and Life video reflection handout in Friday's materials section) Use the video segments Cell Membrane: Homeostasis, Cell Membrane: Diffusion and Cell Membrane: Active Transport to illustrate the importance of water in cellular processes. Review questions for these three videos are also in the Water and Life video reflection handout.</p>	Video reflection handout.
20 min	<p><i>Photosynthesis and Respiration</i> Photosynthesis and Respiration flashcards (See Photosynthesis and Respiration flashcards in Friday's materials section). Pair students and have them create the equation for photosynthesis. <i>Teacher note:</i> It will be important to monitor this process. Explain to the students that they will be studying the process of photosynthesis and respiration at a cellular level. Then have each pair reorganize the cards for cellular respiration and summarize the process in their notes. Have students complete a Venn diagram for photosynthesis and respiration. (See Photosynthesis and Respiration Venn diagram in Friday's materials section).</p>	Student's notes. Completing the Photosynthesis and Respiration Venn diagram

Friday, June 12 (continuation)

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Time	Activity/Task	Assessment
20 min	<p><i>Photosynthesis Activity</i> Use the manipulatives and the poster to have students move kinesthetically through photosynthesis. Divide the students in groups of three and provide them with the organizational charts for light dependent and light independent photosynthesis and one bag with the chart pieces (see Photosynthesis chart and pieces in Friday’s materials section). Ask the students to put the pieces in the order that they think they should go. Watch the video Photosynthesis from Unitedstreaming and complete the Photosynthesis video information handout (see Photosynthesis video information handout in Friday’s materials section).</p>	Completion of organizational charts and video information handout.
20 min	<p><i>Photosynthesis –self evaluation</i> Based in the information from the video ask the students to review their organizational charts and make any changes that they may consider necessary. On the board or in a sheet of chart paper draw the same organizational charts that the students have and working together fill out the information. Ask the students to copy the information on their notebooks and to write a paragraph or two about what they have learned. (See Reflection Guiding questions in Friday’s materials section).</p>	Reflection piece Participation in the classroom discussion
150 min	<p><i>Progress Assessment</i> See Practice test materials in the Friday’s material section.</p>	

Friday's Materials Section

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Water and Life Video

Why is water so important for life?	
Why is water important for plants?	
How is water important for photosynthesis?	
How does water moves up from the soil to the leaf of the plants?	
What is homeostasis?	
Why is the cell membrane important for the cell?	
What are the two ways in which materials can pass through the cell membrane?	
Explain diffusion	
What is osmosis?	
Explain Active Transport	

Photosynthesis and Respiration Flash Cards

OXYGEN	YIELDS	PLUS
CARBON DIOXIDE	PLUS	WATER
SOLAR ENERGY	GLUCOSE	C₆H₁₂O₆
O₂	H₂O	CO₂

Photosynthesis and Respiration Flash Cards

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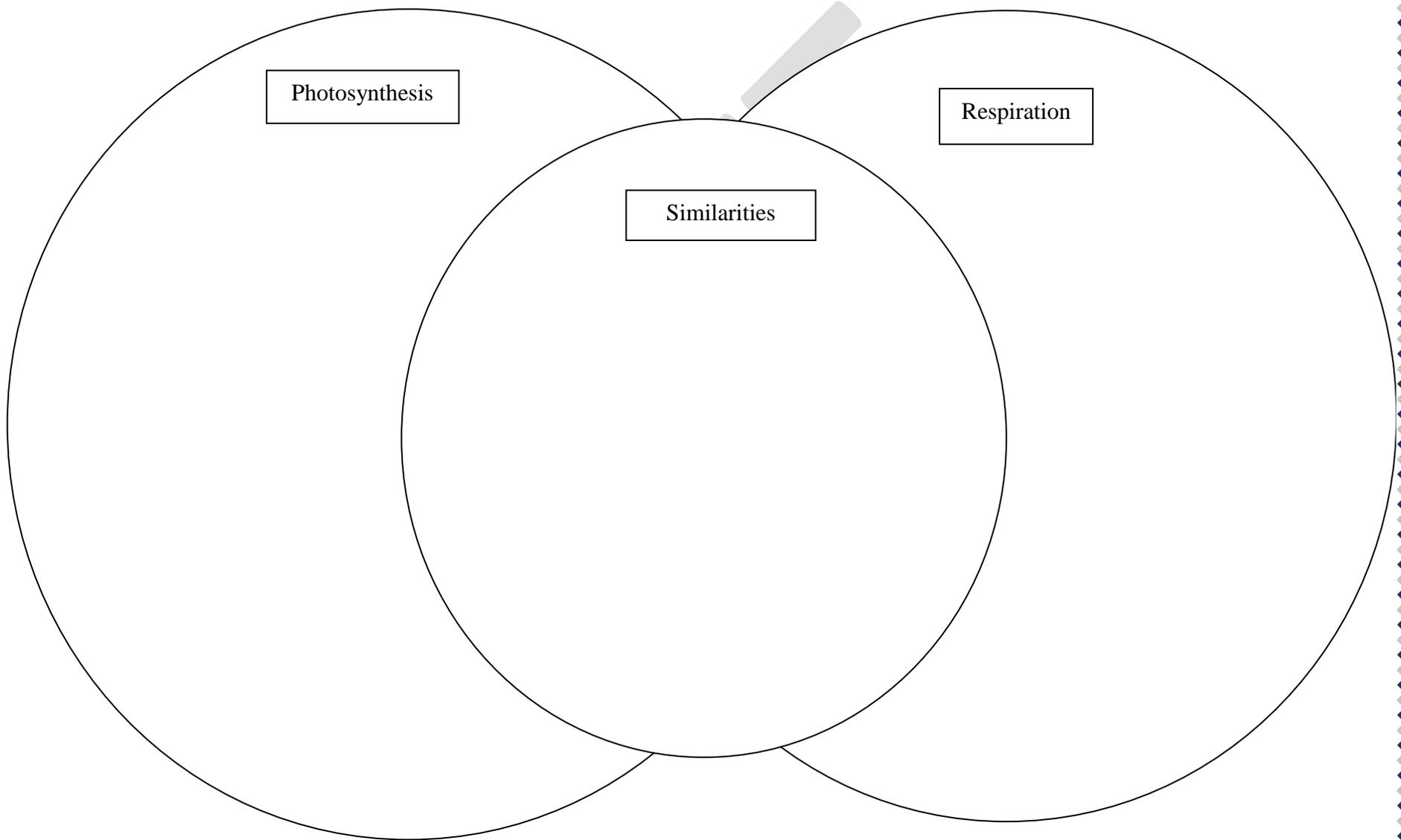
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CHLOROPLAST

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Photosynthesis and Respiration Venn Diagram



Optional Phrases for Venn Diagram

Involves chemical reactions
Occurs in chloroplasts
Occurs in mitochondria
Produces glucose $C_6H_{12}O_6$
Produces H_2O
Requires enzymes
Used by all organisms
Used by animals
Used by plants
Uses CO_2
Uses O_2

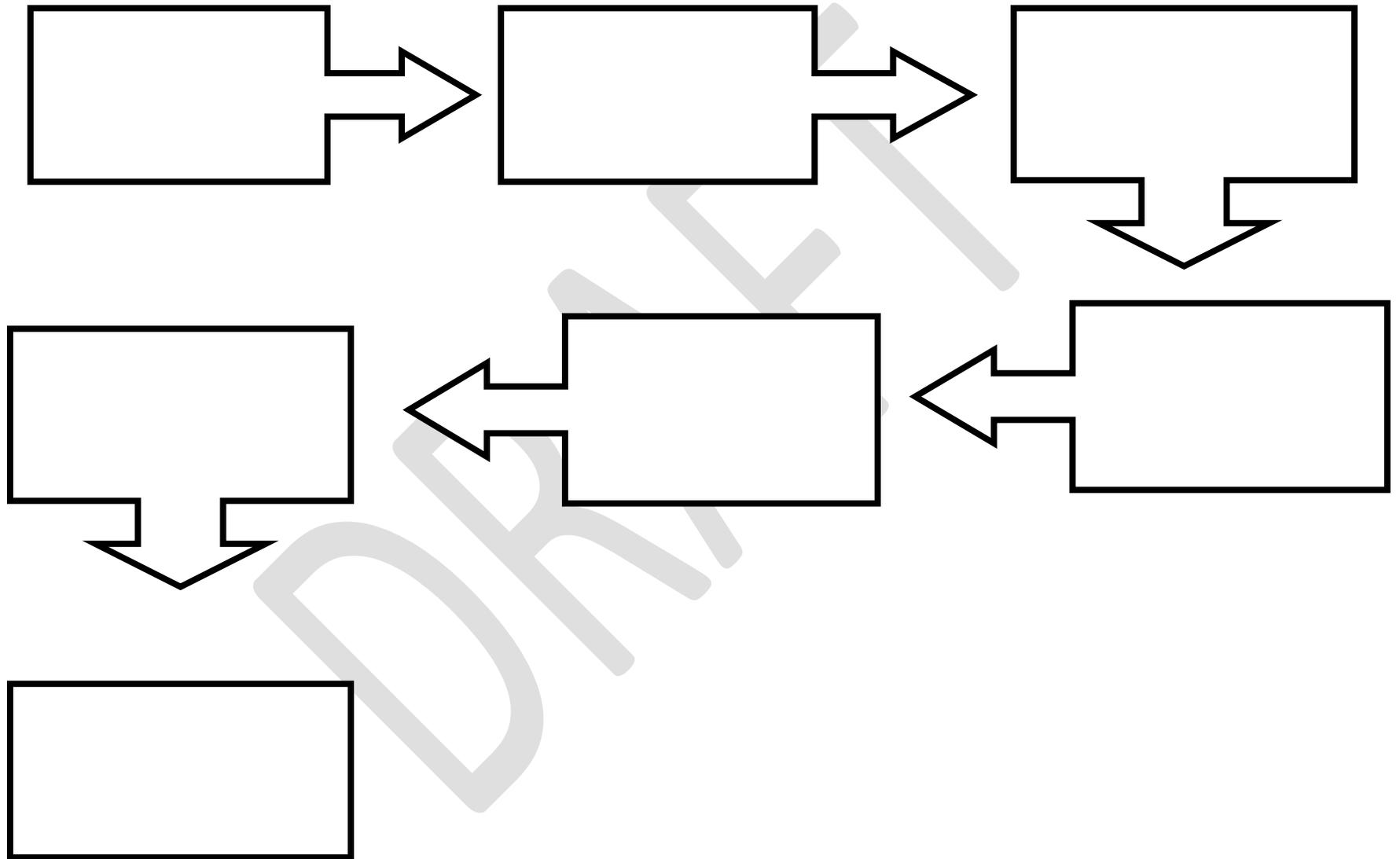
Involves energy
Converts energy from one form to another
Involves an electron transport chain
Light independent reactions (Calvin Cycle)
Light dependent reactions
Requires chlorophyll
Traps light energy
Produces CO_2
Produces O_2
Aerobic or anaerobic
Glycolysis

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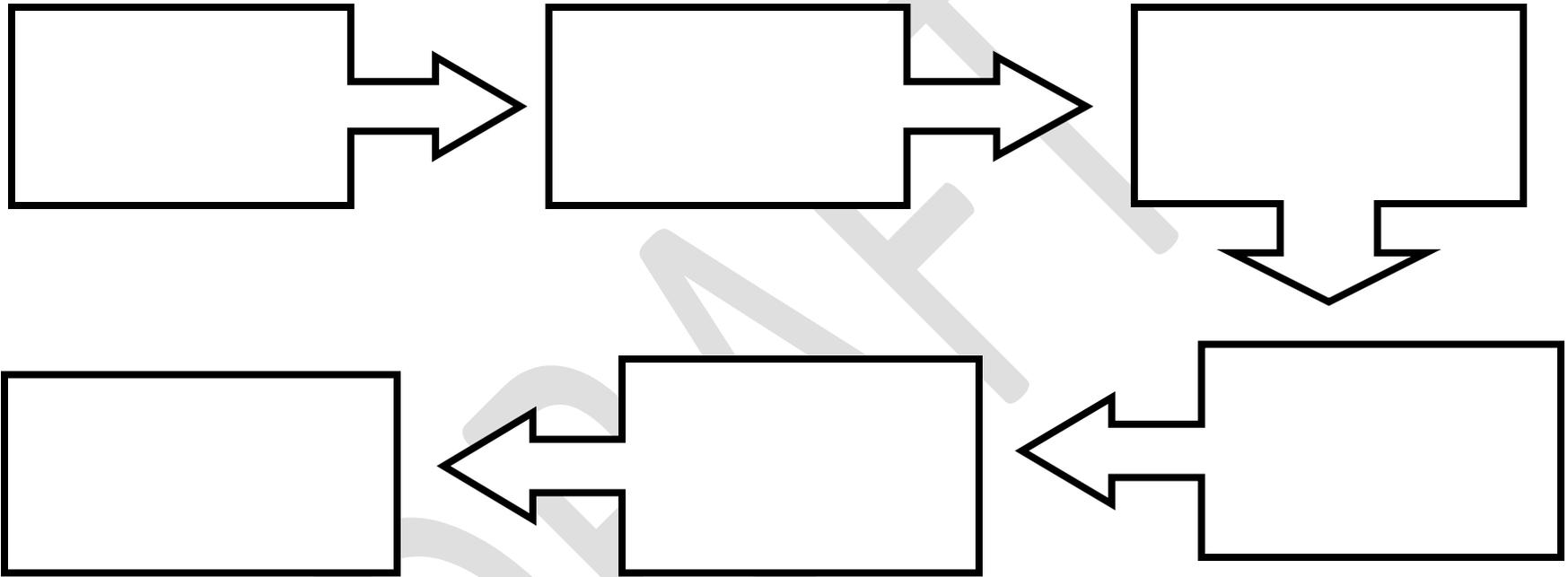
Photosynthesis Pieces

Light is absorbed by chlorophyll in plant leaves.	Energy from light is transferred to electrons in chlorophyll and other plant pigments.	Water molecules are split.
Oxygen molecules are formed (O_2).	Oxygen is released from plant leaves.	Hydrogen ions accumulate inside thylakoids setting up a concentration gradient that provides energy to make ATP & NADPH.
ATP & NADPH provide the energy for the light independent reactions.	A carbon from a molecule of CO_2 is added to a 5-Carbon compound.	The resulting 6-carbon compound splits into two 3-carbon compounds.
One of the 3-carbon compounds is used to make carbohydrates such as starch, cellulose, & glucose for plant growth.	The other 3-carbon compounds are used to regenerate the initial 5-carbon compound.	These reactions may occur without light.
Light is absorbed by chlorophyll in plant leaves.	Energy from light is transferred to electrons in chlorophyll and other plant pigments.	Water molecules are split.
Oxygen molecules are formed (O_2).	Oxygen is released from plant leaves.	Hydrogen ions accumulate inside thylakoids setting up a concentration gradient that provides energy to make ATP & NADPH.
ATP & NADPH provide the energy for the light independent reactions.	A carbon from a molecule of CO_2 is added to a 5-Carbon compound.	The resulting 6-carbon compound splits into two 3-carbon compounds.
One of the 3-carbon compounds is used to make carbohydrates such as starch, cellulose, & glucose sucrose for plant growth.	The other 3-carbon compounds are used to regenerate the initial 5-carbon compound.	These reactions may occur without light.
Photosynthesis is now complete with the release of oxygen in the light dependent reaction and the creation of glucose in the light independent reaction.	Photosynthesis is now complete with the release of oxygen in the light dependent reaction and the creation of glucose in the light independent reaction.	

PHOTOSYNTHESIS LIGHT DEPENDENT REACTIONS



PHOTOSYNTHESIS LIGHT INDEPENDENT REACTIONS



Photosynthesis Video Review

Which organisms have the ability to carry out photosynthesis?	
How are the organisms that are capable of using light energy to produce their own food called?	
How are the organisms that are not capable of using light energy to produce their own food called?	
Write the chemical reaction for photosynthesis and identify its products	
How is glucose used?	
In which organelle does photosynthesis occur?	
What is the role of enzymes in the process of photosynthesis?	
How is the ATP molecule used?	
How is the ATP used?	

Reflection Guide Questions

What I already knew	What I found out