

Unit Title: Cell Respiration

Grade Level: 9-10

Subject Area: Biology

Duration/Length/Number of class periods: 8 class periods (Block periods)

Description: Cell Respiration explains how we take food and oxygen and turn it into usable energy. In this unit students debate why our bodies need oxygen, take guided notes, complete formative lab work, design their own lab on muscle fatigue, and tie concepts together using concept maps and Kahoots.

Established Goals (National, State, Local):

Old Standards

9.4.2.2.1 Use words and equations to differentiate between the processes of photosynthesis and respiration in terms of energy flow, beginning reactants and end products

9.4.1.2.4 Explain the function and importance of cell organelles for prokaryotic and/or eukaryotic cells as related to the basic cell processes of respiration, photosynthesis, protein synthesis and cell reproduction.

New Standards (In process of being approved)

9L.3.3.1.4 Use a model to illustrate that cell respiration is a chemical process in which energy from food used to create new compounds

What Enduring Understandings are desired?

- All living things require energy and cell respiration is the process of how to make it

What Essential Questions will be considered?

- Why do we need to breathe?
- What happens when there is no oxygen?
- How do glucose and oxygen work together?

Students will know / be able to:

- Explain how our bodies create energy
- Explain how glycolysis feeds the kreb cycle which feeds the electron transport chain in order to make ATP

- Explain what happens if oxygen isn't present
- Identify waste products of cell respiration

Description	<i>Units must include at least one of each formative, summative, introductory activity and learning activity. Check the appropriate box; one per row.</i>	Formative	Summative	Introductory Activity	Learning Activity	Student Technology Used	Teacher Technology Used	ISTE Standards
Student discussion Do we share our breath with the trees? If so, how? Why do we breathe? -Padlet				x		x		6a
Powerpoint Notes (Glycolysis, Krebs Cycle, and ETC), Drawing and coloring of mitochondrial structure, TED-Ed / Youtube Videos					x		x	x
BTB Mini Lab (Google Docs / Sheets) - Students will mix 5 mL of BTB with 400 mL of water. Students exhale into a straw and time how long it takes for the solution to turn yellow. Students then run in place for 2 minutes and repeat the BTB steps. Students then analyze group data to see how exercise increases CO ₂ a byproduct of cell respiration (making energy)		x			x	x		7c
Student Design Muscle Fatigue Lab (Google Docs / Sheets) In groups students will share a google doc and design a lab on muscle fatigue. They will need to complete background research, come up with their own research question, create a hypothesis, identify variables and controls and write a numbered procedure. Students then test their labs, analyze the data and complete a conclusion. Lab reports include data tables and graphs			x			x		4a, 5b, 7b
Student Group Concept Map - Students will create a concept map using provided terms. They will diagram how the words relate to each other and explain the connection that they made.		x			x	x		3a, 6c
Kahoot! https://create.kahoot.it/share/cell-respiration/11f2d954-3541-4363-ba7a-756d088558bc		x			x	x	x	x

Test		x		x			6c
Youtube and TED Ed videos on cell respiration https://ed.ted.com/lessons/the-surprising-reason-our-muscles-get-tired-christian-moro Crash Course Cell Respiration Video				x		x	x

Materials, tools and resources:

Powerpoint
 Google Docs
 Google Sheets
 Kahoot!
 Padlet
 Youtube
 TED Ed

BTB Lab:

- BTB solution
- Straws
- Water

Unit Plan Author: Matt McKinney, Highland Park Senior High School

Additional credit given to:

Day-to-day lesson plan?

Day 1: Introduction

Why do we breathe oxygen? Students discuss and share out (verbally or Padlet). Story of Chief Seattle and ask do we share our breath with the trees? How so?

Give an overarching formula with organisms that do cell respiration. Add photosynthesis to this show how it mirrors images.

Draw and color mitochondrial structure

Glycolysis Notes

Concept Map of Glycolysis

Day 2:

Review Glycolysis

Notes on Krebs Cycle

Draw Flow chart of Krebs Cycle

Aerobic Respiration Cartoon

Day 3:

Review Glycolysis and Krebs Cycle

Notes on Electron Transport Chain (ETC)

BTB Mini Lab

Day 4:

Review Glycolysis, Krebs Cycle, and ETC

Watch Video of Cell Respiration

Design Lab on Muscle Fatigue in groups of students

Type Lab Design and if time allows start to take data

Day 5:

Lab Data and Data Processing

Day 6:

Lab Conclusion and Finalize Lab Report

Day 7:

Review:

Concept Map of all 3 steps

Kahoot!

Review Guide

Day 8:

Cell Respiration Exam