

Cellular Respiration

Senior Biology Unit

- 7 Days
- 3 Lessons
- 1 Lab Station Activity
- 1 Reading Comprehension Article
- Time for assessment of student understanding throughout
- Includes NGSS HS-LS1-6 & HS-LS1-7



Daily Teaching Timeline



Cellular Respiration Unit Teaching Timeline

Day 1 and 2 – Introduction to Cellular Respiration Lesson

The lesson covers:

- Aerobic Respiration
- Glycolysis
- Pyruvate Oxidation
- Electron Transport Chain
- Applications
- Anaerobic Respiration and Fermentation
- Lactic Acid
- Microorganisms
- Alcohol Fermentation

Included in the lesson package is:

- The teacher version of the presentation
- The student version of the presentation
- SIX embedded videos
- One classroom activity
- An auto-graded Exit Ticket and a separate quiz with an answer key
- Student lesson handout

Day 3 and 4 – Krebs Cycle and the ETC Lesson – Aerobic Respiration

The Lesson covers:

- Review of Glycolysis & Pyruvate Oxidation
- Krebs/Citric Acid Cycle
- The Electron Transport Chain
- The Role of O₂
- Proton Gradient and Chemiosmosis
- ATP Synthase
- Uncoupling the ETC

Included in the lesson package is:

- The teacher version of the presentation
- The student version of the presentation
- FOUR embedded videos
- Krebs Cycle Online Quiz
- An auto-graded Exit Ticket and a separate quiz with an answer key
- Student lesson handout

Day 5 – Cellular Respiration – 7 Lab Station Activity

Included in the lab is:

- Glycolysis
- Krebs Cycle and the ETC
- Proton Gradient
- Uncoupling Electron Transport and Chemiosmosis

This resource covers the following topics:

- What exercise is
- Different types of exercise
- The benefits of exercise
- General exercise guidelines
- Aerobic vs Anaerobic exercise
- Cardiovascular health and endurance
- Additional research and future issues

Day 7 – Efficiency and Regulation of Cellular Respiration Lesson

The lesson covers:

- How much ATP do we make?
- The Efficiency of Aerobic Respiration
- Metabolic rates
- BMR
- Regulating Cellular Respiration
- Alternatives to Glucose

Included in the lesson package is:

- The teacher version of the presentation
- The student version of the presentation
- Two embedded videos
- An auto-graded Exit Ticket and a separate quiz with an answer key
- Student lesson handout

Cellular Respiration Unit Assessment

Each lesson comes with a 4-question exit ticket which can be used to check for student understanding as well as be included as an assessment if you wish.

The lab station activity and reading can both be used to assess student understanding.

NGSS

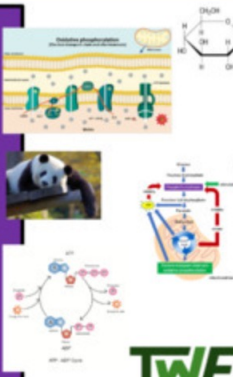
HS-LS1-6 - Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.

HS-LS1-7 - Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed, resulting in a net transfer of energy.

Three Complete Lessons

Efficiency and Regulation of Cellular Respiration

- How much ATP do we make?
- The Efficiency of Aerobic Respiration
- Metabolic rates
 - BMR
- Regulating Cellular Respiration
- Alternatives to Glucose



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Aerobic Respiration Krebs Cycle and the ETC

- Review of Glycolysis & Pyruvate Oxidation
- Krebs/Citric Acid Cycle
- The Electron Transport Chain
- The Role of O_2
- Proton Gradient and Chemiosmosis
- ATP Synthase
- Uncoupling the ETC



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Introduction to Cellular Respiration & Fermentation

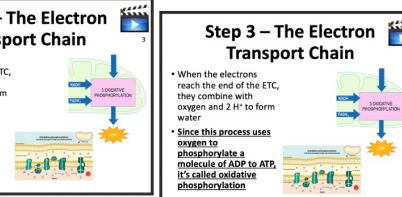
- Aerobic Respiration
- Glycolysis
- Pyruvate Oxidation
- Electron Transport Chain
- Applications
- Anaerobic Respiration and Fermentation
- Lactic Acid
- Microorganisms
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TWF

Step 3 – The Electron Transport Chain

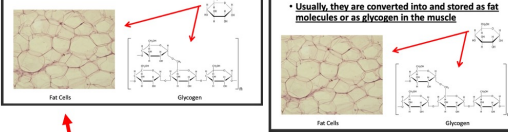
- When the electrons reach the end of the ETC, they combine with oxygen and $2 H^+$ to form water
- Since this process uses oxygen to phosphorylate a molecule of ADP to ATP, it's called oxidative phosphorylation



Student and Teacher versions of the presentations

Excess Sugars

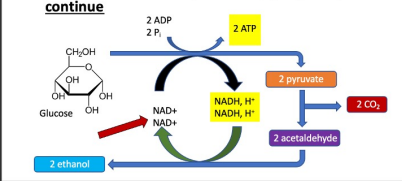
- What happens to excess sugars, such as glucose, when they are not needed for metabolism?
- Usually, they are converted into and stored as fat molecules or as glycogen in the muscle



Student and Teacher versions of the presentations

Alcohol (Ethanol) Fermentation

- Occurs in plant cells, bacteria and yeast
- Allows NAD^+ to be recycled and glycolysis to continue



Videos embedded directly into the slides. One-click access

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Interactive and Engaging Activities

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Exercise and its Importance for Health - Scientific Reading Comprehension Article

Exercise and its Importance for Overall Health

Exercise is a key factor in overall health. It helps to improve cardiovascular health, reduce the risk of chronic diseases, and improve mental health. Regular exercise can also help to improve sleep, boost energy, and reduce stress.

Benefits of Exercise

Exercise has many benefits for overall health. It helps to improve cardiovascular health, reduce the risk of chronic diseases, and improve mental health. Regular exercise can also help to improve sleep, boost energy, and reduce stress.

Exercise is a key factor in overall health. It helps to improve cardiovascular health, reduce the risk of chronic diseases, and improve mental health. Regular exercise can also help to improve sleep, boost energy, and reduce stress.

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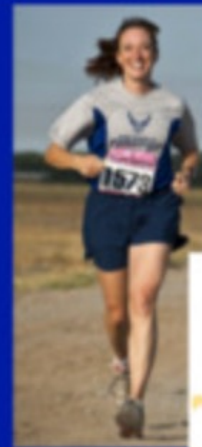
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Improve your students **Scientific Literacy** and **Analysis Skills**, use as an **Emergency Substitute Plan** or create **Applicability** in your classroom

Cellular Respiration Lab Station Activity



7 Lab Station Activities to get your kids out of their seats and engaged in their learning

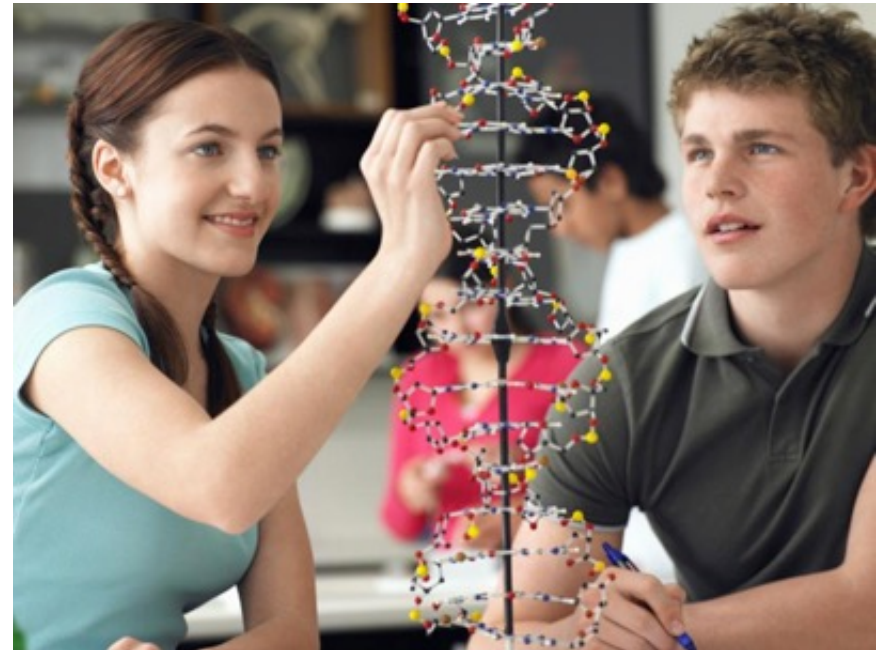
Get away from tired practices and unengaged students



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Provide a Scientifically-Proven means of instruction

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Incorporate Technology and Increase Collaboration



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