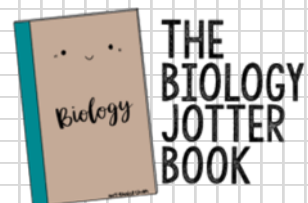


Respiration Part 1

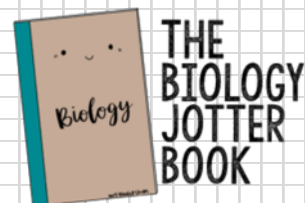
Chapter 10



Aerobic Respiration is...

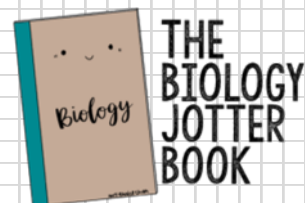
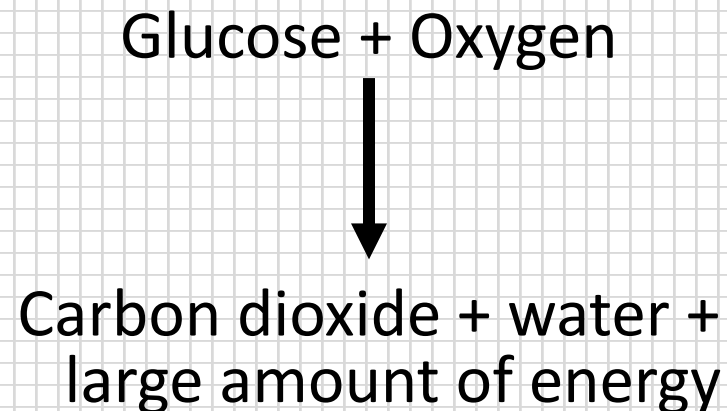
*the oxidation of glucose in the presence of oxygen,
with the release of a large amount of energy.*

Carbon dioxide and water are released as waste products.



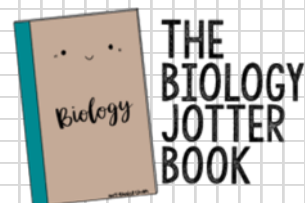
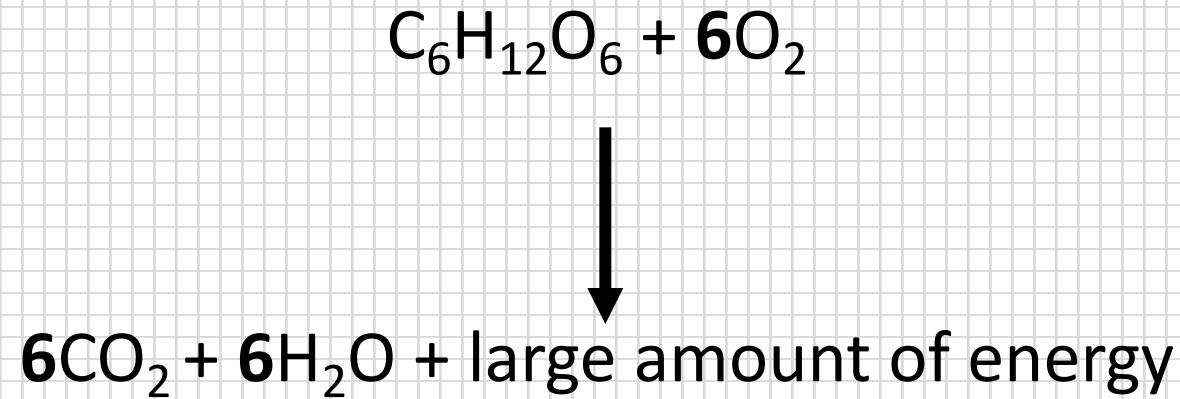
Aerobic Respiration

- Process requires many steps and involves many enzymes
- Site of respiration: **Mitochondria** in cells
- **The word equation:**



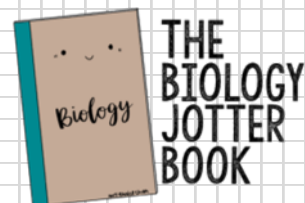
Aerobic Respiration

- **The chemical equation:**



Energy Consuming Processes in Body

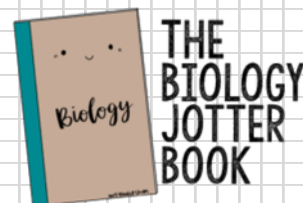
- Synthesis of proteins from amino acids
- Cell division
- Muscular contractions (e.g. heartbeats)
- Active transport
- Transmission of nerve impulses
- The maintenance of a constant body temperature



Anaerobic Respiration is...

*the oxidation of glucose in the absence of oxygen,
with a small amount of energy being released.*

(Anaerobic respiration is ***less efficient*** than aerobic respiration.)



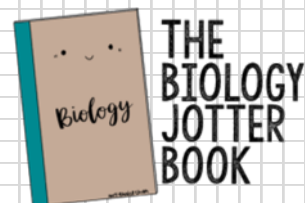
In yeast cells...

- a.k.a. Alcoholic fermentation
- **The word equation:**

Glucose



Ethanol + carbon dioxide +
small amount of energy



In Muscle Cells...

During vigorous exercise...

Muscles contract vigorously



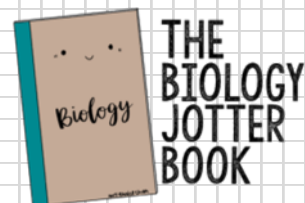
Muscle cells respire aerobically first



Breathing rate increases to quickly remove CO_2
and take in O_2



Heart beats faster for transport of O_2 to muscles



In Muscle Cells...

When there is insufficient oxygen...

Muscle cells also carry out anaerobic respiration to release **extra energy**



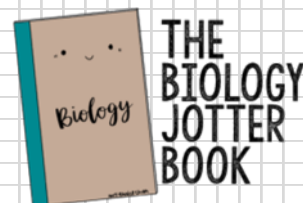
Lactic acid is formed in the process



High concentration of the toxic lactic acid causes **fatigue** and muscular pains



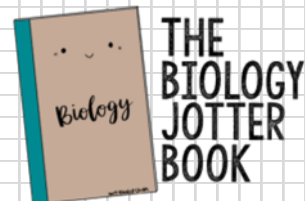
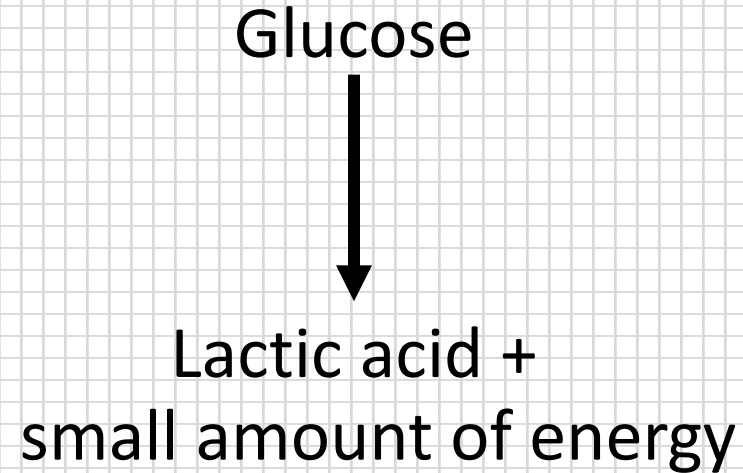
Muscles incur (experience) an **oxygen debt**



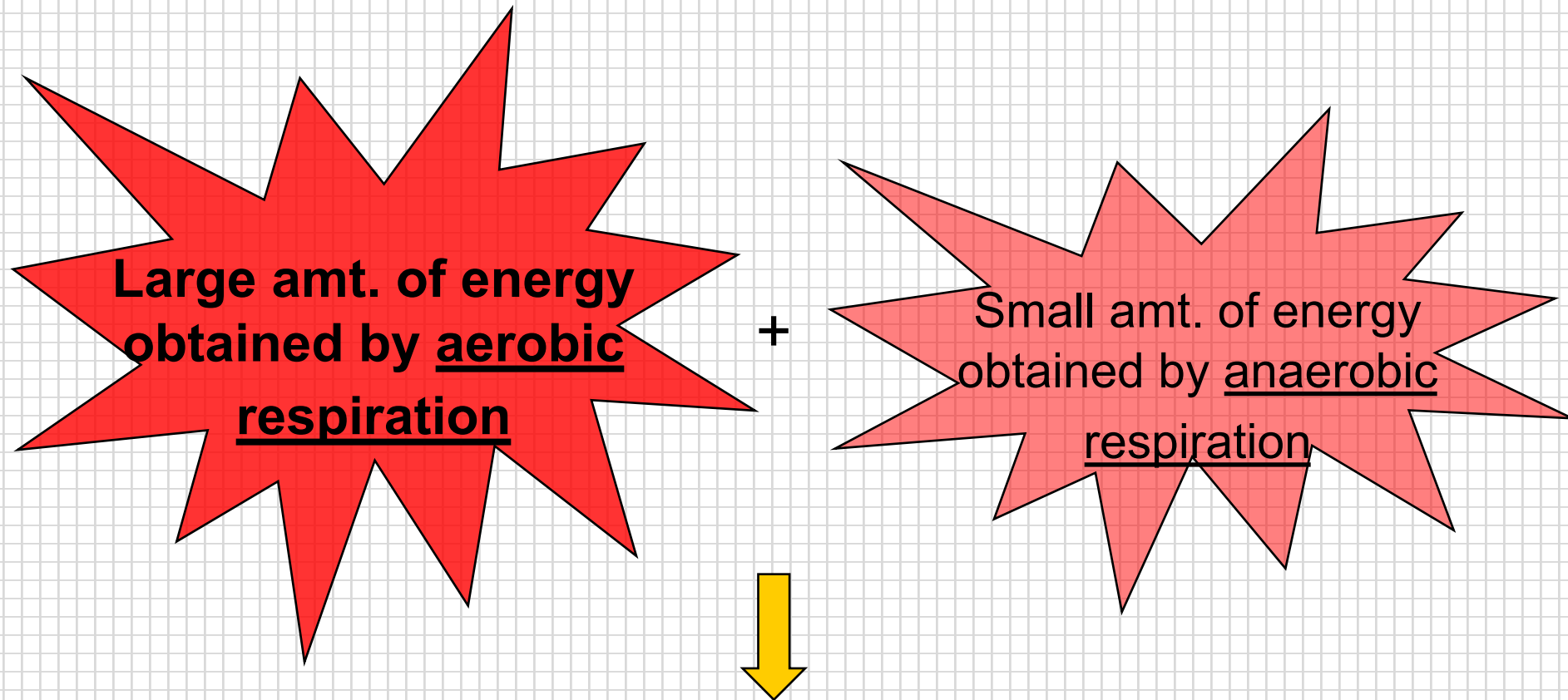
In Muscle Cells...

- **When anaerobic respiration occurs...**

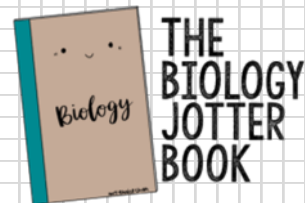
The word equation:



In Muscle Cells...

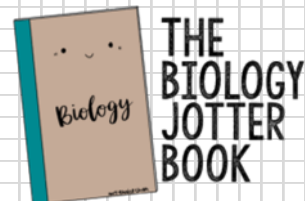
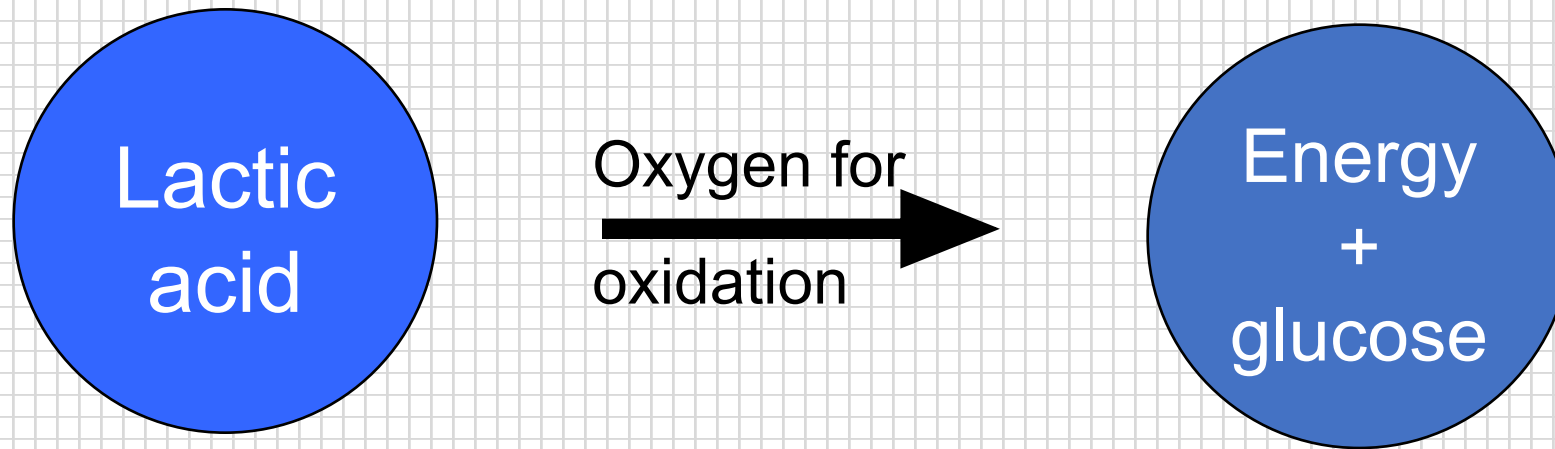


Total energy required for vigorous muscular contractions

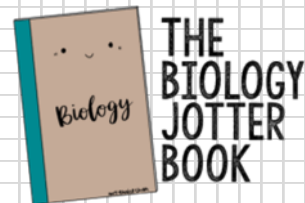
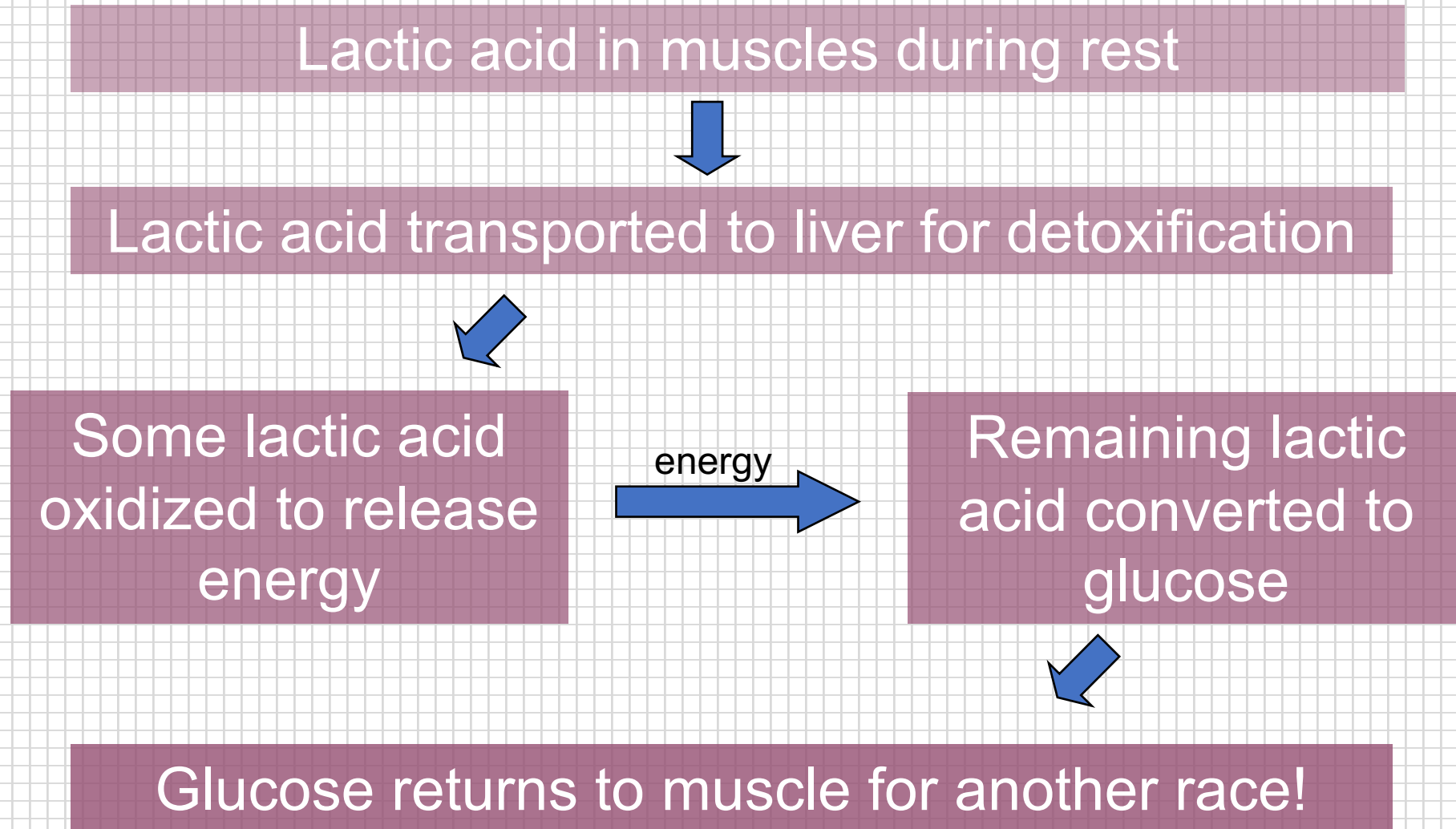


Oxygen Debt

Amount of oxygen required to oxidize the lactic acid produced in muscles during anaerobic respiration

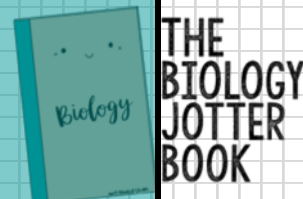


Getting ready for another race...



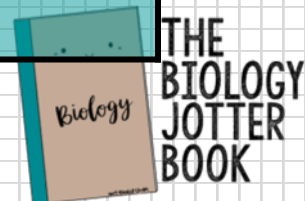
Aerobic Respiration vs. Anaerobic Respiration

Aerobic Respiration	Anaerobic Respiration
Condition: Presence of oxygen	Condition: Absence of oxygen
Respiratory products: $\text{CO}_2 + \text{H}_2\text{O} + \text{large amount of energy}$	Respiratory products: <u><i>In plants, yeast cells:</i></u> Ethanol + CO_2 + a little energy <u><i>In animals:</i></u> Lactic acid + a little energy



Aerobic Respiration vs. Anaerobic Respiration

Aerobic Respiration	Anaerobic Respiration
<p>Energy liberated: Releases all available energy within each glucose molecule</p>	<p>Energy liberated: Releases less energy because glucose is only partially broken down</p>
<p>Site of occurrence: Mitochondria of cells</p>	<p>Site of occurrence: Cytoplasm of cells</p>



Cellular Respiration

