

## Chapter outline examples- good and not so good.

This is a good example of a chapter 9 outline beginning.

Bio ch. 9 Outline  
Ch. 9: Cellular Respiration and Fermentation (pg 248 - 264) Mr. Hartzog

### 9.1: Cellular Respiration: An Overview (pg. 250)

#### I Chemical Energy + Food

- Food → provides living things w/ chem. building blocks to grow + reproduce
- organisms get the energy they need from food
- calorie - amount of energy needed to raise the temp. of 1 gram of water 1 degree Celsius
- cells break down food molecules gradually, capturing a little bit of chemical energy at key steps

#### II Overview of Cellular Respiration

- cellular respiration - the process that releases energy from food in the presence of oxygen
- or
- $$6\text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6 \rightarrow 6\text{CO}_2 + 6\text{H}_2\text{O} + \text{Energy}$$
- Oxygen + glucose → carbon dioxide + water + energy

##### A.) Stages of Cell. Resp.

- 3 main stages: glycolysis, Krebs cycle, electron transport chain
- glucose enters chem. pathway called glycolysis
  - ↳ small amount of energy is captured to produce ATP
  - ↳ end of glycolysis, 90% chem. energy = unused
- Pyruvic acid enters Krebs cycle
  - ↳ little more energy is gathered
- Electron transport chain
  - ↳ bulk of energy gathered
  - ↳ requires reactants from other 2 cycles
  - ↳ oxygen → world's most powerful electron acceptor

##### B.) Oxygen + Energy

- Oxygen is required at the very end of electron transport chain →



This is another good example of a chapter 9 outline starter...

## 9.1: Cellular Respiration: An Overview

### Chemical Energy and Food

- ↳ food provides living things with chemical building blocks they need to grow and reproduce \*organisms get the energy they need from food\*
- ↳ energy stored in food is expressed in units of calories
- ↳ Calorie = the amount of energy needed to raise the temperature of 1 gram of water 1 degree Celsius  
(Calorie = kilocalorie / 1000 calories)
- ↳ Cells break down food molecules gradually, capturing a little bit of chemical energy at key steps
  - ↳ enables cells to use the energy stored in chemical bonds of food like glucose to produce compounds such as ATP that directly power the activities of the cell

### Overview of Cellular Respiration

- ↳ Cellular respiration is the process that releases energy from food in the presence of oxygen
- ↳ in symbols:  $6O_2 + C_6H_{12}O_6 \rightarrow 6CO_2 + 6H_2O + \text{energy}$
- ↳ in words: oxygen + glucose  $\rightarrow$  carbon dioxide + water + energy
  - ↳ (not simple) cell needs to find a way to trap those little bits of energy by using them to make ATP

### Stages of Cellular Respiration

- ↳ 3 stages - glycolysis, Krebs Cycle, and Electron Transport
- ↳ Concentrate on one food molecule: glucose
  - ↳ glycolysis: small amount of energy captured to release ATP, at the end of the process about 90% of energy still unused, locked in chemical bonds of pyruvic acid
- ↳ pyruvic acid  $\rightarrow$  Krebs cycle (little more energy regenerated)
  - ↳ electron transport: uses oxygen as electron acceptor  
(bulk of energy used)





This is an example of an outline that would not get credit. This looks more like a vocab list which could be made without actually reading the chapter. It is also for chapter 9 so you can directly compare it to the other 2 examples.

- 1) Calorie - the amount of energy needed to raise the temperature of 1 gram of water 1 degree Celsius. The calorie that is used on food labels is kilocalorie or 1,000 calories.
- 2) Cellular respiration - the process that releases energy from food in the presence of oxygen. Involves dozens of separate reactions.
- 3) Aerobic - "in air". The Krebs cycle and electron ~~transport~~ transport chain are both aerobic processes.
- 4) Anaerobic - "without air". Glycolysis is said to be anaerobic.
- 5) Photosynthesis - removes carbon dioxide from the atmosphere, and cellular respiration puts it back.
- 6) Glycolysis - "sugar breaking". During glycolysis 1 molecule of glucose, a 6-carbon compound, is transformed into 2 molecules of pyruvic acid.
- 7) NAD<sup>+</sup> - Nicotinamide adenine dinucleotide. Each NAD<sup>+</sup> molecule accepts a pair of high-energy electrons.
- 8) Krebs cycle - named after Hans Krebs. ~~The~~ Pyruvic acid is broken down into carbon dioxide in a series of energy-extracting reactions.
- 9) Matrix - the innermost compartment of the mitochondrion and the site of the Krebs cycle reactions.