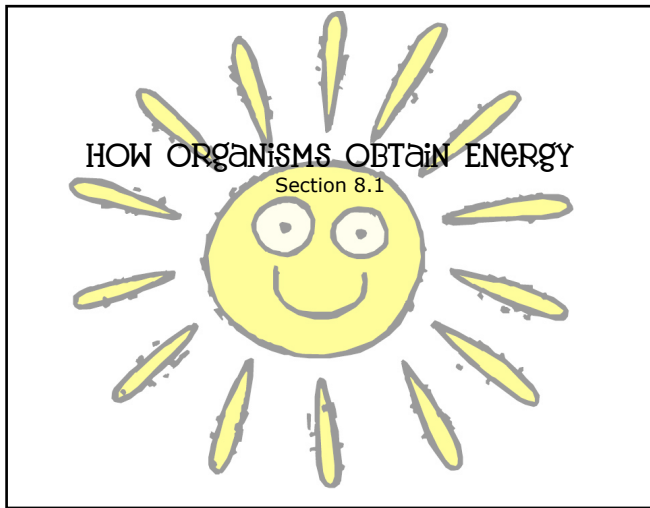


8.1 How Organisms Obtain Energy



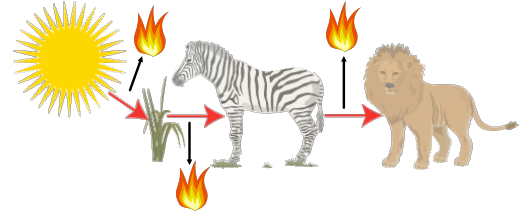
ENERGY

- ability to do work
- thermodynamics

studies the flow and transformation of energy

1st law: energy can be transferred, but cannot be created or destroyed

2nd law: energy cannot be transferred w/o the loss of usable energy (usually heat)



FOOD ENERGY
BECOMES CHEMICAL
ENERGY

What law of
thermodynamics is
this?

WHAT LAW OF
THERMODYNAMICS
EXPLAINS WHY WE
SWEAT WHEN WE
EXERCISE?

ALL ORGANISMS NEED **ENERGY**
TO MAINTAIN HOMEOSTASIS...

ANIMALS **EAT** & PLANTS DO
PHOTOSYNTHESIS TO OBTAIN
GLUCOSE...

GLUCOSE CAN BE CONVERTED
INTO THE **ENERGY** ORGANISMS
USE TO DO WORK...

1 MATA: Energy

- A is the ability to do work
- B can be created
- C cannot be destroyed
- D is stored in glucose
- E is lost as heat

2 Animals eat and plants do photosynthesis in order to get glucose, which is an energy rich molecule.

True

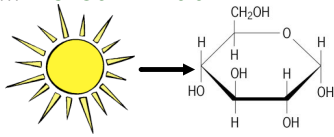
False

8.1 How Organisms Obtain Energy

SO, HOW DO ORGANISM OBTAIN GLUCOSE?

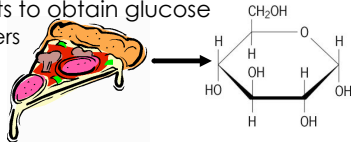
• autotrophs (self feeders) - make their own food by converting energy from the sun (solar) into glucose (chemical energy)... **PHOTOSYNTHESIS**

a.k.a. producers
ex. plants



• heterotrophs (other feeders) - cannot make their own glucose, so they eat plants or animals that have eaten plants to obtain glucose

a.k.a. consumers
ex. animals

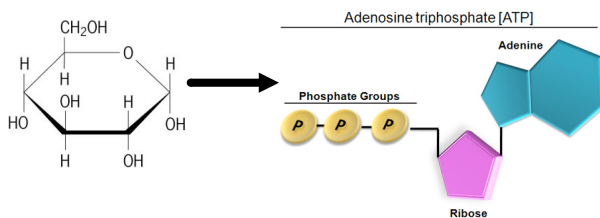


3 MATA: Autotrophs obtain glucose from

- A the foods they eat
- B the sun's energy
- C cellular respiration
- D photosynthesis



CELLULAR RESPIRATION
CONVERTS THE **ENERGY** IN
GLUCOSE INTO **ATP** ENERGY...



ATP is THE **ENERGY**
ORGANISMS SPEND TO
DO WORK...

ATP is like cash money!

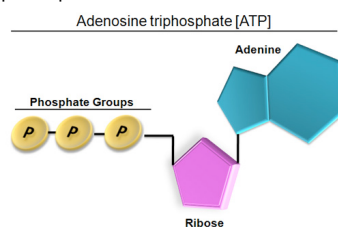


ATP

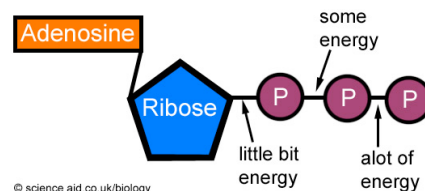
- "energy currency of life"
- basic energy source for ALL cells
- glucose is the most common fuel source...
- but organisms can also use fat and proteins

• ATP - adenosine triphosphate

nitrogen base
5-carbon sugar
3 phosphates



4 What molecule is this?

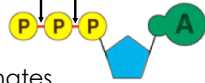


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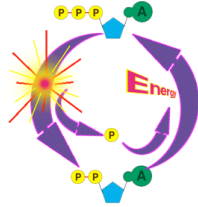
8.1 How Organisms Obtain Energy

ATP & ADP

- chemical energy is stored in bonds
- ATP stores energy between its phosphates



- ADP - adenosine diphosphate same as ATP, but only 2 phosphates
- organisms use glucose to turn ADP into ATP, then when the organism needs energy they break ATP into ADP + P + energy



5 MATA: ATP

- A is the energy currency of life
- B stands for adenosine triphosphate
- C stores energy in its phosphate bonds
- D is formed from the breakdown of glucose
- E is formed by plants during photosynthesis

6 ATP can be broken down into

- A ADP only
- B ADP + P only
- C ADP + P + energy
- D ADP + P + P + energy

7 Why do organisms need glucose?

- A to make ATP
- B to make ADP
- C both A and B
- D neither A or B

ATP =



We can spend it now!

NADP

NADH =

FADH₂

(energy transfer molecules)



Need to take it to the bank first...

REVIEW QUESTIONS

- What is energy?
- What does the 1st law of thermodynamics say about energy?
- What is an autotroph?
- How are heterotrophs different than autotrophs?
- What is the energy currency of life?
- Where is the energy stored in ATP?