Key

Biology Energy Unit Study Guide

Energy storage

1. What is meant by "energy flow" in a system

2. How is energy stored in each of the following:

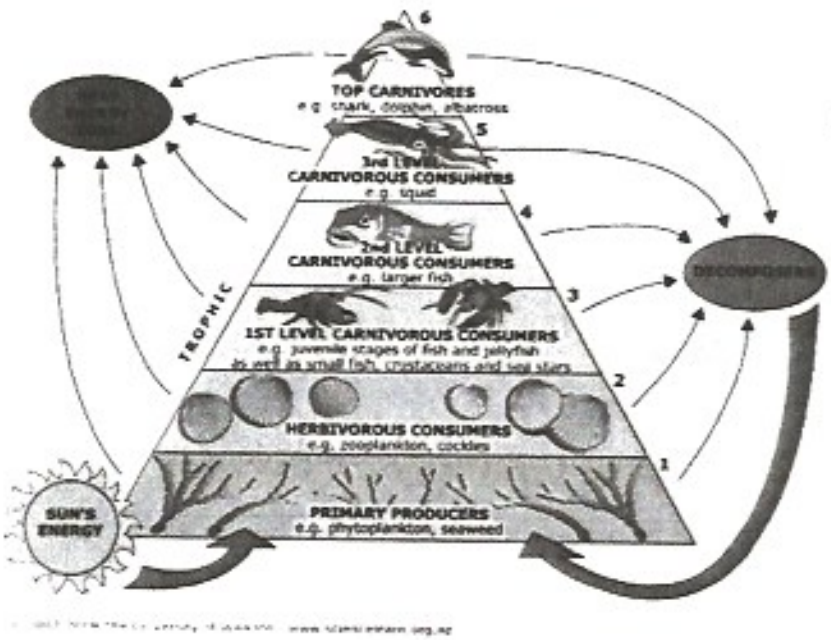
Kinetic energy	moving objects - movement
Gravitational energy	position - objects up high where gravity can pull them down
Chemical energy	In bonds between atoms & molecules - in mass
Light energy	In sunlight
Heat energy	In moving atoms

3. What is the difference between a first-order, second-order and third-order consumer?
first order - primary consumer - they eat producers
2nd order eat first order. 3rd order eat 2nd order

4. Explain what a food chain is and give an example.
a path of food consumption. Grass - Grasshopper - Toad

5. Explain what a food web is and give an example.
Interconnected food chains

6. Use the diagram below to answer the following questions.



a. What is one food chain pictured?
Phytoplankton → zooplankton → jellyfish → squid

b. What would happen if the zooplankton & cockles disappeared?
the higher order consumers would die off (No food)

c. How does the available energy change as matter and energy move from the phytoplankton to the dolphin?
There is less available energy - check Food Chains & Energy worksheet.

7. What does the answer to question 6c above, say about energy flow and trophic levels in an ecosystem?
You "lose" energy as you go up in trophic levels. The energy isn't really lost - just in a form not accessable.

8. Is the flow efficient, meaning most of the energy moves to the next level? (Think about the energy graphs in the worksheet Energy Exercise 1)

NO - alot of energy is converted to heat and can't be accessed

Digestion

9. Explain what digestion is.

The chemical and mechanical break-down of food into smaller components that can be absorbed.

10. Compare the digestion systems of the following:

Compare/contrast

Organism	Digestive Anatomy	Purpose
Earthworm	mouth - Esophagus - Crop - Gizzard - Intestine - Anus	Gizzard to grind large intestine to absorb nutrients
Grasshopper	Esophagus - crop - gizzard - stomach - intestine - Anus	large crop for storage
Frog	Esophagus - stomach - small intestine - large intestine - Anus	No gizzard
Pig	mouth-teeth - esophagus - stomach - small intestine - large intestine - Anus	

All allow for food to be broken up and nutrients absorbed

Cellular Respiration

11. Explain what cellular respiration is.

Breaking up glucose into CO_2 and water to get energy and oxygen

11. Write the equation for cellular respiration

$C_6H_{12}O_6 + O_2 \rightarrow 6CO_2 + 6H_2O + \text{energy}$

12. What three processes are involved with cellular respiration & what do you get out of them?

Glycolosis — pyruvate + 2 ATP

Krebs Cycle — CO_2 & H_2O

Electron Transport Chain — 32 ATP

13. Which cells and what kind of organisms do cellular respiration?

all cells — all organism

14. What is the difference between aerobic and anaerobic respiration?

aerobic uses oxygen. Anaerobic does not

15. Explain what fermentation is.

When no oxygen is present. Lactic acid or ethanol & CO_2 produced instead of H_2O & CO_2

16. Write the equations for fermentation.

① $C_6H_{12}O_6 \rightarrow 2C_3H_6O_3$ Lactic Acid

② $C_6H_2O_6 \rightarrow 2CO_2 + 2CH_3CH_2OH$ ethanol

17. Why is ATP (adenosine triphosphate) so important?

All cells use this molecule to get energy for all the ~~cells~~ work cells do.

Photosynthesis

17. Explain what photosynthesis is.

using Light to make glucose

This was missing from class notes

18. Write the equation for photosynthesis.

Light + $6CO_2$ + $6H_2O \rightarrow C_6H_{12}O_6$ + $6O_2$

19. What is the difference between the light and dark reactions in photosynthesis?

Light - use sunlight to make O_2 & ATP and H_2O

dark - use ATP and CO_2 to make glucose

20. Compare cellular respiration and photosynthesis.

They are opposite