

Environmental Science Study Guide

Matter and Energy in the Environment

Vocabulary

Understand and be able to apply each of these terms.

1. Matter –
2. Energy –
3. Atoms –
4. Elements -
5. Molecules –
6. Potential Energy –
7. Kinetic Energy –
8. Photosynthesis (equation) –
9. Cell respiration (equation) –
10. First Law of Thermodynamics –
11. Second Law of Thermodynamics –
12. Biogeochemical Cycles -

Critical Thinking

Be able to read, analyze, and give complete answers to questions like these.

1. Besides water, where does most of the mass in a fully-grown tree come from? Where did people originally believe it came from?
2. Identify each of the following as **atoms** or **molecules**. If they are molecules, identify if they are **elements** or **compounds**.

O₂

CO₂

H₂O

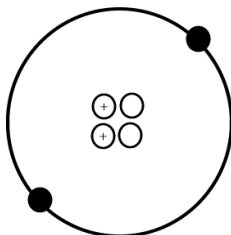
Fe

S

3. What were the results of Jean Baptiste von Helmont's willow tree experiment? What hypothesis was rejected as a result of his experiment?

4. Joseph Priestley did experiments where he placed a candle and a mouse into a sealed jar. What happened to them? What did he discover?

5. Label the protons, neutrons, and electrons in the atom below.



6. Air is a mixture of the following molecules. Name each molecule. Identify the elements present in each one.

Molecule	Name	Elements Present
N ₂		
O ₂		
H ₂ O		
CO ₂		

7. Which two of the above molecules makes up the majority (99%) of air?

8. Give one example of each of the following types of energy:
 - a. Potential energy (as a result of position) –
 - b. Potential energy (as a result of chemical structure) –
 - c. Kinetic energy –

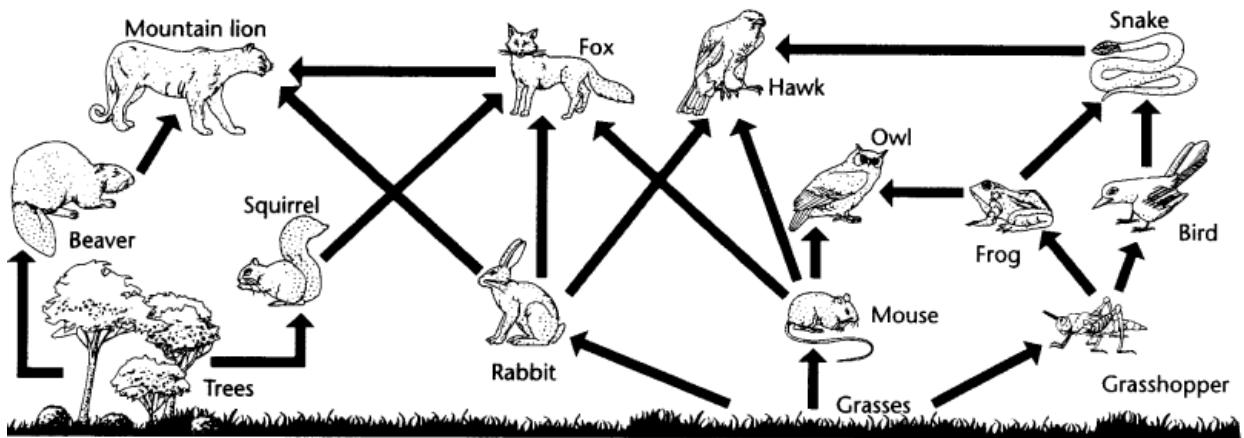
9. What three wavelengths of energy are found in sunlight? Specifically what wavelengths can plants use for photosynthesis?

10. As energy moves through a food chain, about what percent actually transfers and is incorporated into the next level up? What happens to the remaining energy? (Hint: Second Law of Thermodynamics)

11. Complete the following statement: Food webs and food chains show the flow of _____, while the biogeochemical cycles describe the recycling of _____.

12. In addition to water, list the other elements there are biogeochemical cycles for.

13. Place each of the animals below into one of the different trophic levels listed.



Producers –

Primary Consumers –

Secondary Consumers –

Tertiary Consumers -

14. The food web diagram used in the previous question did not have any decomposers. Give two examples of decomposers that could be added. What would be their source of energy?

15. Which trophic level always contains herbivores?