



Practice Midterm Exam

***Raven, Berg, Hassenzahl: Environment, 7th Edition***  
***Chapter 03: Ecosystems and Energy***

1. The Chesapeake Bay is:
  - a) home to many hydrothermal vent organisms
  - b) an ecosystem with two-way energy flow due to complex interactions
  - c) not part of the Earth's hydrosphere
  - d) one of the world's richest estuaries
  - e) abyssal plain of the Atlantic Ocean

Ans: d

Difficulty: Easy

**Response:**

Chapter Opener; 3.0

2. Typical inhabitants of a salt marsh include all of the following except:
  - a) shrimp
  - b) meadow voles
  - c) mosquitoes
  - d) frogs
  - e) terrapins

Ans: d

Difficulty: Easy

**Response:**

Chapter Opener; 3.0

3. Which of the following is an abiotic factor of the environment?
  - a) living spaces
  - b) disease organisms
  - c) photosynthesis
  - d) producers
  - e) detritivores

Ans: a

Difficulty: Easy

**Response:**

What is Ecology?; Opener; 3.1

4. The biotic environment includes a variety of components including:
  - a) saprotrophs
  - b) protozoa
  - c) primary producers
  - d) decomposers
  - e) all of these

Ans: e

Difficulty: Easy

**Response:**

What is Ecology?; Opener; 3.1



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5. A species is defined as:
- a) organisms that live together
  - b) organisms that live in the same area at the same time
  - c) a group of similar organisms whose members freely interbreed with one another
  - d) all of the organisms that live together in an area, plus the physical environment that they live in
  - e) all organisms at a given trophic level within a particular community

Ans: c

Difficulty: Easy

**Response:**

What is Ecology?; Opener; 3.1

6. Which of the following series is organized according to the levels of organization used by ecologists?
- a) population -> ecosystem -> community
  - b) species -> community -> abiotic factors
  - c) species -> ecosystem -> population
  - d) population -> community -> biotic factors
  - e) population -> community -> ecosystem

Ans: e

Difficulty: Easy

**Response:**

What is Ecology?; Opener; 3.1

7. An ecosystem can be characterized as:
- a) populations + community
  - b) all species, population, and community interactions for organisms in a given area
  - c) the abiotic components of the environment
  - d) all of the biological interactions, plus interactions with the abiotic environment, in a given area
  - e) interactions between physical processes and the abiotic environment

Ans: d

Difficulty: Easy

**Response:**

What is Ecology?; Opener; 3.1

8. Landscape ecology:
- a) is the study of human-designed communities
  - b) examines the influences of human activity on natural ecosystems
  - c) is exclusively concerned with terrestrial ecosystems
  - d) studies the connections among various ecosystems in a particular region
  - e) none of these

Ans: d

Difficulty: Easy

**Response:**

What is Ecology?; Opener; 3.1



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9. All of the following are components of the hydrosphere except:

- a) sea ice
- b) tropical rainstorms
- c) soil
- d) hail
- e) rivers

Ans: c

Difficulty: Easy

**Response:**

What is Ecology?; Opener; 3.1

10. The Earth's crust, made of rock and soil, is known as the:

- a) hydrosphere
- b) ecosphere
- c) biosphere
- d) lithosphere
- e) atmosphere

Ans: d

Difficulty: Easy

**Response:**

What is Ecology?; Opener; 3.1

11. The chemical energy stored in a plant is an example of:

- a) kinetic energy
- b) nuclear energy
- c) solar energy
- d) potential energy
- e) radiant energy

Ans: d

Difficulty: Easy

**Response:**

The Energy of Life; Opener; 3.2

12. Which of the following is an example of a closed system?

- a) Earth
- b) ocean
- c) desert
- d) hydrothermal vent
- e) none of these

Ans: e

Difficulty: Easy

**Response:**

The Energy of Life; Opener; 3.2



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13. The First Law of Thermodynamics states that:

- a) energy can be created or destroyed by physical processes
- b) entropy always increases
- c) energy cannot be created or destroyed
- d) the organization of the universe is steadily increasing
- e) energy transfer between organisms is inefficient and much energy is lost

Ans: c

Difficulty: Easy

**Response:**

The Energy of Life; The First Law of Thermodynamics; 3.2.1

14. Entropy is a measure of:

- a) the amount of energy in a system
- b) the amount of work done
- c) the disorder in a system
- d) the efficiency of a system
- e) the rate of energy use in a system

Ans: c

Difficulty: Easy

**Response:**

The Energy of Life; The Second Law of Thermodynamics; 3.2.2

15. Energy flow through an ecosystem involves:

- a) producers
- b) consumers
- c) decomposers
- d) the sun
- e) all of these

Ans: e

Difficulty: Easy

**Response:**

The Flow of Energy Through Ecosystems; Opener; 3.3

16. Energy:

- a) recycles continuously through an ecosystem
- b) is used over and over again
- c) flows in only one direction through an ecosystem
- d) tends to be concentrated by living organisms
- e) is efficiently transferred between trophic levels

Ans: c

Difficulty: Easy

**Response:**

The Flow of Energy Through Ecosystems; Opener; 3.3



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17. Sunlight is the energy source used during which process?

- a) respiration
- b) glycolysis
- c) mitochondria
- d) chemosynthesis
- e) none of these

Ans: e

Difficulty: Medium

**Response:**

The Energy of Life; Photosynthesis and Cellular Respiration; 3.2.3

18. The correct, chemically balanced equation for photosynthesis is:

- a)  $12\text{CO}_2 + 6\text{H}_2\text{O} + \text{RADIANT ENERGY} \square \text{C}_6\text{H}_{12}\text{O}_6 + 12\text{O}_2$
- b)  $6\text{CO}_2 + 12\text{H}_2\text{O} + \text{RADIANT ENERGY} \square \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} + 6\text{O}_2$
- c)  $12\text{O} + \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} \square 6\text{CO}_2 + 12\text{H}_2\text{O} + \text{ENERGY}$ .
- d)  $12\text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6 + 12\text{H}_2\text{O} \square 6\text{CO}_2 + 12\text{H}_2\text{O} + \text{ENERGY}$
- e)  $6\text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} \square 6\text{CO}_2 + 12\text{H}_2\text{O} + \text{ENERGY}$

Ans: b

Difficulty: Medium

**Response:**

The Energy of Life; Photosynthesis and Cellular Respiration; 3.2.3

19. Which of the following organisms are capable of cellular respiration?

- a) green plants
- b) bacteria
- c) carnivores
- d) algae
- e) all of these

Ans: e

Difficulty: Medium

**Response:**

The Energy of Life; Photosynthesis and Cellular Respiration; 3.2.3

20. The correct, chemically balanced equation for cellular respiration is:

- a)  $12\text{CO}_2 + 6\text{H}_2\text{O} + \text{RADIANT ENERGY} \square \text{C}_6\text{H}_{12}\text{O}_6 + 12\text{O}_2$
- b)  $6\text{CO}_2 + 12\text{H}_2\text{O} + \text{RADIANT ENERGY} \square \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} + 6\text{O}_2$
- c)  $\text{C}_6\text{H}_{12}\text{O}_6 + 12\text{H}_2\text{O} \square 6\text{CO}_2 + 12\text{H}_2\text{O} + \text{ENERGY}$
- d)  $12\text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6 + 12\text{H}_2\text{O} \square 6\text{CO}_2 + 12\text{H}_2\text{O} + \text{ENERGY}$
- e)  $6\text{O}_2 + \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{H}_2\text{O} \square 6\text{CO}_2 + 12\text{H}_2\text{O} + \text{ENERGY}$

Ans: e

Difficulty: Medium

**Response:**

The Energy of Life; Photosynthesis and Cellular Respiration; 3.2.3



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21. Which of the following is not a product of cellular respiration?

- a) carbon dioxide
- b) water
- c) sugar
- d) energy
- e) both carbon dioxide and water

Ans: c

Difficulty: Medium

**Response:**

The Energy of Life; Photosynthesis and Cellular Respiration; 3.2.3

22. Carbohydrates are not:

- a) stored potential energy
- b) made mostly of nitrogen and carbon
- c) broken down by cellular respiration
- d) made by producers
- e) used by decomposers

Ans: b

Difficulty: Medium

**Response:**

The Energy of Life; Photosynthesis and Cellular Respiration; 3.2.3

23. The ultimate source of energy for communities associated with hydrothermal vents is:

- a) hot seawater
- b) sinking detritus from the surface waters
- c) energy derived from photosynthesis, as in almost all other communities
- d) chemical synthesis of organic molecules by bacteria
- e) algae

Ans: d

Difficulty: Easy

**Response:**

The Energy of Life; Case in Point: Life Without the Sun; 3.2.4

24. Chemosynthesis supports which of the following ecosystems?

- a) salt marsh
- b) forest
- c) estuary
- d) desert
- e) hydrothermal vents

Ans: e

Difficulty: Easy

**Response:**

The Energy of Life; Case in Point: Life Without the Sun; 3.2.4



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25. Which of the following organisms are producers in hydrothermal vent communities?

- a) bacteria
- b) algae
- c) fungi
- d) moss
- e) none of these

Ans: a

Difficulty: Medium

**Response:**

The Energy of Life; Case in Point: Life Without the Sun; 3.2.4

26. Which of the following are producers?

- a) nutrient-rich waters
- b) rabbits
- c) algae
- d) fungi
- e) saprotrophs

Ans: c

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Producers, Consumers and Decomposers; 3.3.1

27. Decomposers are:

- a) bacteria and fungi
- b) consumers
- c) saprotrophs
- d) heterotrophs
- e) all of these are correct

Ans: e

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Producers, Consumers and Decomposers; 3.3.1

28. A secondary consumer would eat:

- a) tertiary consumers
- b) fungi
- c) bacteria
- d) herbivores
- e) lions

Ans: d

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Producers, Consumers and Decomposers; 3.3.1



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29. A primary consumer would eat:

- a) secondary consumers
- b) plants
- c) bacteria
- d) herbivores
- e) rabbits

Ans: b

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Producers, Consumers and Decomposers; 3.3.1

30. Decomposers provide mineral nutrients for:

- a) heterotrophs
- b) autotrophs
- c) the second trophic level
- d) the third trophic level
- e) omnivores

Ans: b

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Producers, Consumers and Decomposers; 3.3.1

31. Detritivores consume:

- a) leaf litter
- b) animal carcasses
- c) feces
- d) all of these
- e) leaf litter and animal carcasses only

Ans: d

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Producers, Consumers and Decomposers; 3.3.1

32. Each level or "link" in a food chain or a food web is called:

- a) a trophic level
- b) a consumer
- c) an energy flow unit
- d) an equivalent
- e) entropy

Ans: a

Difficulty: Easy

**Response:**

The Flow of Energy Through Ecosystems; The Path of Energy Flow: Who Eats Whom in Ecosystems; 3.3.2





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33. The dominant herbivores in the Antarctic food web are:

- a) baleen whales
- b) squid
- c) krill
- d) king and emperor penguins
- e) barnacles and mussels

Ans: c

Difficulty: Easy

**Response:**

The Flow of Energy Through Ecosystems; Case in Point: How Humans Have Affected the Antarctic Food Web; 3.3.3

34. In the Antarctic food web the base of the food chain is occupied by:

- a) krill
- b) minnows
- c) algae
- d) tuna
- e) deep-sea bacteria

Ans: c

Difficulty: Easy

**Response:**

The Flow of Energy Through Ecosystems; Case in Point: How Humans Have Affected the Antarctic Food Web; 3.3.3

35. Which of the following is one of the most productive ecosystems?

- a) algal beds
- b) estuaries
- c) coral reefs
- d) all of these
- e) both estuaries and coral reefs only

Ans: d

Difficulty: Easy

**Response:**

The Flow of Energy Through Ecosystems; Ecosystem Productivity; 3.3.5

36. In human cells, energy utilization is about \_\_\_\_\_ efficient compared to an automobile engine, which is about \_\_\_\_\_ efficient.

- a) 1% / 100%
- b) 10% / 50%
- c) 25% / 90%
- d) 40% / 25%
- e) 75% / 10%

Ans: d

Difficulty: Medium

**Response:**

The Energy of Life; The Second Law of Thermodynamics; 3.2.2



Practice Midterm Exam

37. Of the following, which statement is false?

- a) The second law of thermodynamics predicts that although localized areas may temporarily increase in the degree of order, the overall randomness of the universe will not decrease.
- b) Energy flow in ecosystems is linear, or one-way.
- c) Photosynthesis converts the energy of the sun into stored chemical energy.
- d) Cellular respiration converts carbohydrates into usable energy and heat.
- e) Only about half the energy available in an organism is transferred to the consumer that eats it.

Ans: e

Difficulty: Medium

**Response:**

The Energy of Life and The Flow of Energy Through Ecosystems; Entire Section; 3.3

38. In a pyramid of biomass, the tropic level of which organism would have the least biomass?

Grass, is eaten by grasshoppers, which are eaten by toads, which are eaten by snakes

- a) grass
- b) grasshoppers
- c) toads
- d) snakes
- e) none of these, all tropic levels would be of equal biomass

Ans: d

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Ecological Pyramids; 3.3.4

39. In an ecosystem such as Chesapeake Bay, producers:

- a) provide food
- b) provide shelter
- c) provide oxygen
- d) all of these
- e) both provide food and provide oxygen only

Ans: e

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Producers, Consumers and Decomposers; 3.3.1

40. The chlorophyll in producers captures \_\_\_\_\_, and transforms it into chemical energy stored in \_\_\_\_\_.

- a) electrons; waste products
- b) light energy; organic compounds such as carbohydrates
- c) nuclear energy; chemicals such as DNA
- d) light energy; the ozone
- e) heat energy; the ability to do work

Ans: b

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Producers, Consumers and Decomposers; 3.3.1



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41. Many important, nonliving factors within an open (eco)system are recycled, although some are not. The survival of an open system depends on an exchange of \_\_\_\_\_ with its surroundings.
- a) energy
  - b) carbon dioxide
  - c) plants
  - d) oxygen
  - e) nitrogen

Ans: a

Difficulty: Medium

**Response:**

The Energy of Life; Opener; 3.2

42. The major biological source of oxygen, which many organisms require when they break down glucose, is actually a by-product of:
- a) cellular respiration
  - b) chemosynthesis
  - c) entropy
  - d) photosynthesis
  - e) global warming

Ans: d

Difficulty: Medium

**Response:**

The Energy of Life; Photosynthesis and Cellular Respiration; 3.2.3

43. Net primary productivity represents:
- a) plant growth per unit area per unit time
  - b) energy per unit area per unit time
  - c) the energy available to herbivore.
  - d) amount of biomass found in excess of that broken down by a plant's cellular respiration
  - e) all of these

Ans: e

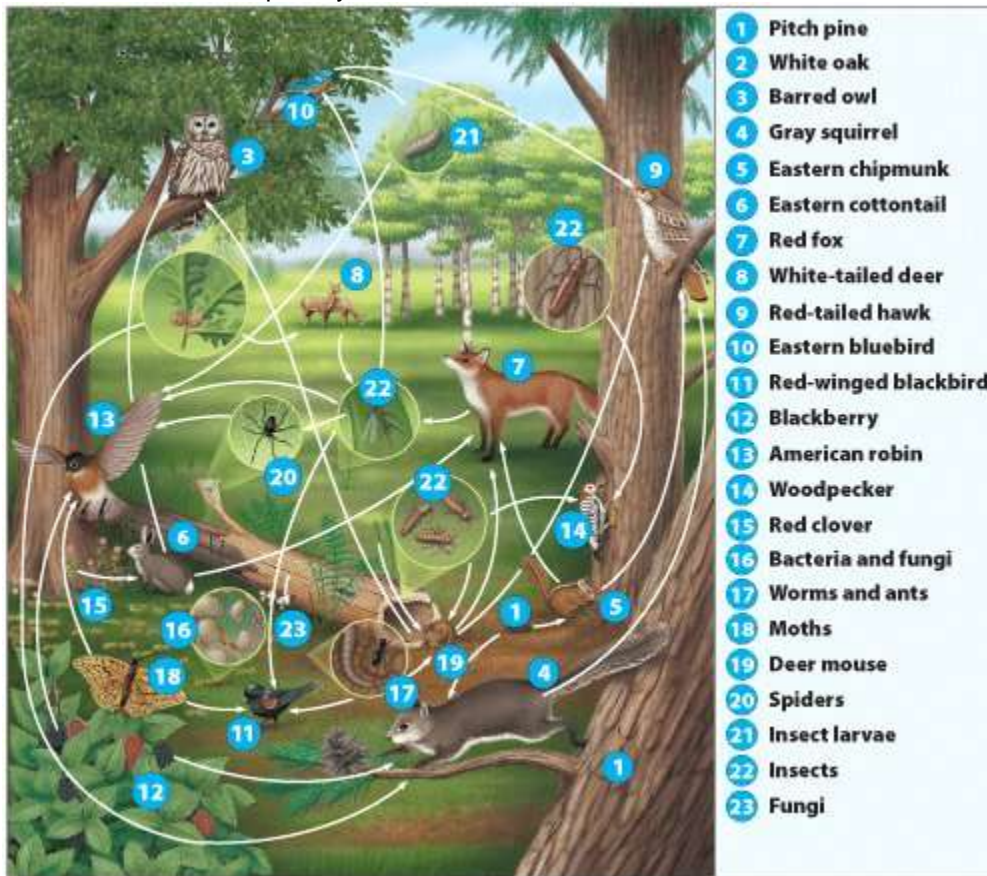
Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Ecosystem Productivity; 3.3.5

Practice Midterm Exam

44. Which statement best portrays the eastern cottontail in the food web below?



- a) consumers that eat producers are primary consumers or herbivores
- b) secondary consumers eat primary consumers
- c) both secondary and tertiary consumers are carnivores
- d) tertiary consumers are also called heterotrophs
- e) primary consumers are detritus feeders

Ans: a

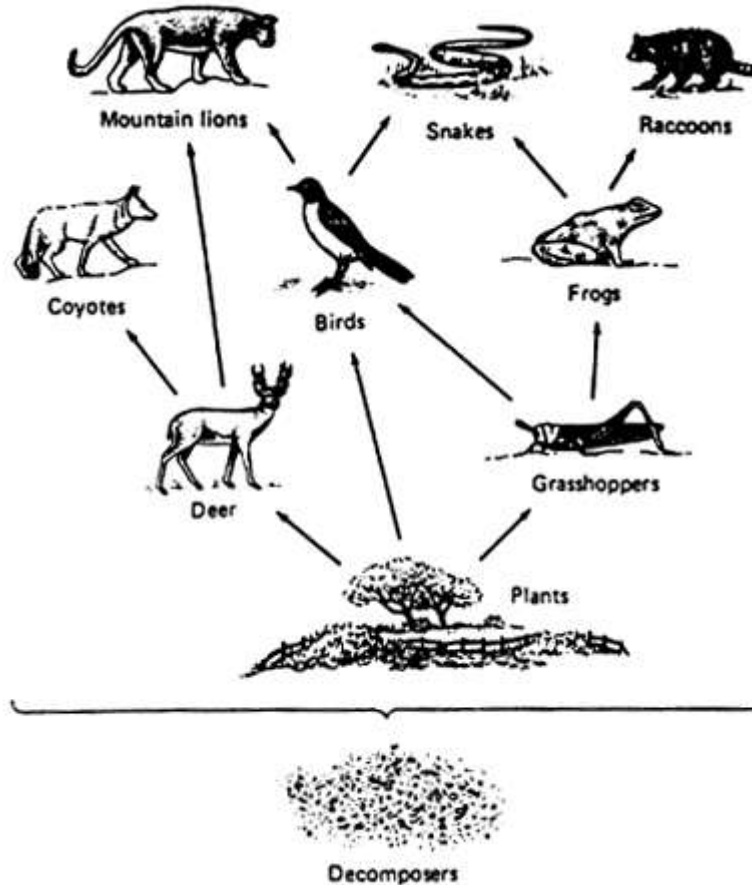
Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Ecological Pyramids; 3.3.4

Practice Midterm Exam

45. In the food web below, the mountain lion is an example of:



- a) a tertiary consumer
- b) an autotroph
- c) a saprotroph
- d) a herbivore
- e) an omnivore

Ans: a

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Ecological Pyramids; 3.3.4



Practice Midterm Exam

46. In October of 2003, a raging wildfire swept through the mountain ecosystems in Southern California, burning everything in its path to the ground and driving away all of the animals. In order for the mountain ecosystem to re-establish itself, which member of the food web has to return first?
- a) deer
  - b) snakes
  - c) birds
  - d) coyotes
  - e) grasses

Ans: e

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Ecological Pyramids; 3.3.4

47. Which term encompasses the other four?
- a) community
  - b) population
  - c) species
  - d) biosphere
  - e) ecosystem

Ans: d

Difficulty: Medium

**Response:**

What is Ecology?; 3.1

48. An example of a biotic component of an ecosystem is
- a) the climate
  - b) a community
  - c) water
  - d) synthetic pesticide
  - e) rock

Ans: b

Difficulty: Medium

**Response:**

What is Ecology?; 3.1



Practice Midterm Exam

49. In a pyramid of numbers, the largest number of organisms would typically be found:
- a) at the highest end of the food chain, with each lower trophic level occupied by fewer organisms
  - b) at the highest end of the food chain, with each lower trophic level having the same number of organisms
  - c) at the lowest end of the food chain, with each successive trophic level occupied by fewer organisms
  - d) at the lowest end of the food chain, with each successive trophic level having the same number of organisms
  - e) none of these

Ans: c

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Ecological Pyramids; 3.3.4

50. In a pyramid of energy, the lowest quantity of energy (kcal/m<sup>2</sup>/year), would be found in the:
- a) producers
  - b) primary consumers
  - c) secondary consumers
  - d) tertiary consumers
  - e) herbivores

Ans: d

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Ecological Pyramids; 3.3.4

51. Which of the following is not a concern related to human impact on the Antarctic food web?
- a) global warming
  - b) commercial whaling
  - c) thinning of the ozone layer
  - d) harvesting krill
  - e) none of these, all are human impacts on the Antarctic

Ans: e

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Case in Point: How Humans Have Affected the Antarctic Food Web; 3.3.3

52. Which of the following is not critical for a balanced ecosystem?
- a) decomposers
  - b) producers
  - c) plants
  - d) consumers
  - e) humans

Ans: e

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Producers, Consumers and Decomposers; 3.3.1





Practice Midterm Exam

53. All of the following refer to primary consumers except:

- a) carnivore
- b) consumers that eat autotrophs
- c) rabbits
- d) herbivores
- e) second trophic level

Ans: a

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Ecological Pyramids; 3.3.4

54. With respect to \_\_\_\_\_, every ecosystem is open.

- a) species
- b) populations
- c) the first and second laws of thermodynamics
- d) energy flow
- e) inorganic compounds

Ans: c

Difficulty: Medium

**Response:**

The Energy of Life; Opener; 3.2

55. Detritivores, scavengers, and decomposers are similar in that they

- a) consume nonliving organic matter
- b) are primarily microorganisms
- c) are primarily producers
- d) are among the Earth's least useful organisms
- e) are found only in the water

Ans: a

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Producers, Consumers and Decomposers; 3.3.1

56. Why do deep-sea organisms cluster around hydrothermal vents?

- a) these organisms prefer the warmth of the vent
- b) these organisms depend on the organic material drifting down from surface waters to the vent for food
- c) these organisms obtain energy by chemosynthesis from inorganic molecules of vents
- d) these organisms have a light phobia
- e) these organisms use the pressure of the deep ocean to metabolize organic molecules

Ans: c

Difficulty: Medium

**Response:**

The Energy of Life; Case in Point: Life Without the Sun; 3.2.4





Practice Midterm Exam

57. Which of the following is not a form of energy?

- a) mechanical
- b) radiant
- c) solar
- d) stagnant
- e) chemical

Ans: d

Difficulty: Easy

**Response:**

The Energy of Life; Opener; 3.2

58. One \_\_\_\_\_ is the amount of energy required to raise the temperature of 1 kg of water by 1 degrees Celsius?

- a) kilojoule
- b) molecule
- c) atomic nuclei
- d) thermodynamic
- e) kilocalorie

Ans: e

Difficulty: Easy

**Response:**

The Energy of Life; Opener; 3.2

59. Which of the following statements about energy is true?

- a) Organisms can reuse energy for biological work.
- b) Organisms can create the energy required to live.
- c) The energy present in the universe will always be the same amount.
- d) Energy cannot change from one form to another.
- e) None of these are true.

Ans: c

Difficulty: Medium

**Response:**

The Energy of Life; The First Law of Thermodynamics; 3.2.1

60. Which of the following is responsible for the sharp decrease in the population of hippos in Lake Edward?

- a) overfishing
- b) the military
- c) polluted water
- d) algal bloom leading to large fish kills
- e) none of these

Ans: b

Difficulty: Easy

**Response:**

The Flow of Energy Through Ecosystems; Environews – the hippo-tilapia connection



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61. Energy cannot be created or destroyed, but it can be converted from one form to another is the:

- a) second law of thermodynamics
- b) first law of thermodynamics
- c) theory of relativity
- d) first law of centrifugation
- e) energy transformation

Ans: b

Difficulty: Easy

**Response:**

The Energy of Life; First Law of Thermodynamics; 3.2.1

62. Energy enters almost all ecosystems as:

- a) mechanical energy
- b) recycled energy
- c) potential energy
- d) radiant energy
- e) none of these

Ans: d

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Opener; 3.3

63. What category would carnivores fall into?

- a) heterotrophs
- b) tertiary consumers
- c) omnivores
- d) secondary consumers
- e) both tertiary consumers and secondary consumers

Ans: e

Difficulty: Easy

**Response:**

The Flow of Energy Through Ecosystems; The Path of Energy Flow: Who Eats Whom in Ecosystems; 3.3.2

64. Which of the following represent the interlocking of food chains which connects organisms in an ecosystem?

- a) community
- b) trophic level
- c) food web
- d) symbiosis
- e) saprotrophy

Ans: c

Difficulty: Easy

**Response:**

The Flow of Energy Through Ecosystems; The Path of Energy Flow: Who Eats Whom in Ecosystems; 3.3.2



Practice Midterm Exam

65. Which of the following statements is true about the human interference with the Antarctic food web?

- a) Humans have had little impact on the Antarctic food web.
- b) Whaling was only a small contributor to the decline in krill population.
- c) There is still an abundance of pack ice to provide marine algae for krill.
- d) Low krill population increases the breeding success of penguins and fur seals.
- e) None of these are true.

Ans: e

Difficulty: Medium

**Response:**

The Flow of Energy Through Ecosystems; Case In Point: How Humans Have Affected the Antarctic Food Web; 3.3.3