

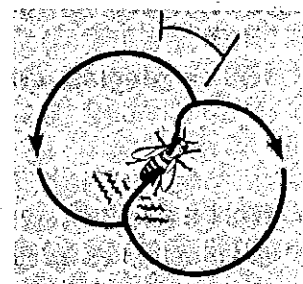
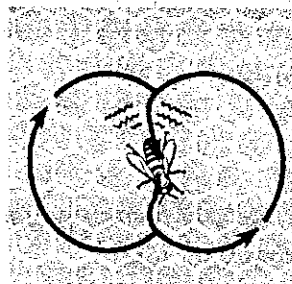
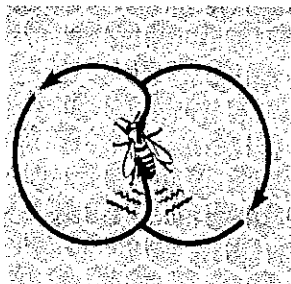
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CHAPTER 51: ANIMAL BEHAVIOR

CONCEPT 51.1 DISCRETE SENSORY INPUTS CAN STIMULATE BOTH SIMPLE AND COMPLEX BEHAVIORS

1. What is a **fixed action pattern**? (FAP) ? Give an example.
2. What is a sign stimulus?
3. What is migration? Give one example of a bird, an insect, and one other animal that migrate and explain why.
4. Explain what is meant by **circadian clock** and **circadian rhythms**. Identify two behaviors, either plant or animal, that demonstrate a circadian rhythm. (You may need to refer to Chapter 40 or Chapter 49 for this example)
5. Discuss two navigational strategies used by birds to migrate.
6. Animals communicate in various ways. Discuss at least three specific examples using different organisms.
7. Karl von Frisch studied European honeybees. What are the two types of dances that a returning worker bee does, and what information does each dance convey? Use the sketch to describe each dance.



8. What are **pheromones**? Give three specific types of information that can be transmitted through pheromones.

CONCEPT 51.2 LEARNING ESTABLISHES SPECIFIC LINKS BETWEEN EXPERIENCE AND BEHAVIOR

9. What is the difference between **innate** and **learned** behavior? Give an example of each.
10. Describe the process of **imprinting**, and explain what is meant by **sensitive** or **critical** period.
11. Describe the classic study of **parental imprinting** done by Konrad Lorenz.
12. There are several types of learning. What occurs in **spatial learning**?
13. What are two types of **associative learning**? Which type is **Ivan Pavlov** use to get a dog to salivate at the sound of a bell?
14. What occurs in **operant conditioning**?
15. What is **cognition**? Give three examples of cognition in animal species; include at least one bird behavior.

CONCEPT 51.3 SELECTION FOR INDIVIDUAL SURVIVAL AND REPRODUCTIVE SUCCESS CAN EXPLAIN MOST BEHAVIORS

16. What is **foraging behavior**?
17. What is proposed by the **optimal foraging theory**? Explain it in terms of cost and benefit, and cite two examples from your text.

18. Explain each of these mating systems and give an example of each:

a. **Promiscuity**

b. **Monogamy**

c. **Polygamy**

d. **Polygyny**

e. **Polyandry**

19. Explain two factors that may be important in determining the evolution of these systems, and apply each factor to a particular species.

20. Let's return to an earlier idea from *Chapter 23 (see page 482)*. What is *sexual selection*?

21. There are two types of sexual selection. Explain each of them.

22. What is *agnostic behavior*? Give one example of this behavior that is not in your book.

CONCEPT 51.4 INCLUSIVE FITNESS CAN ACCOUNT FOR THE EVOLUTION OF BEHAVIOR, INCLUDING ALTRUISM

23. What is *altruism*:

24. Explain the evolutionary advantage to a population of having members who exhibit *altruistic behavior*.

25. *Altruism* may reduce the fitness of an individual – for example, by making that individual more obvious to a predator. Explain this behavior using the concept of *inclusive fitness*.

26. Contrast *kin selection* and *reciprocal altruism*

CHAPTER 52: AN INTRODUCTION TO ECOLOGY AND THE BIOSPHERE

27. Study Figure 52.2 in your text. It shows the different levels of the biological hierarchy studied by ecologists. Notice also the different types of questions that might be studied by an ecologist at each level of study. Use this figure to define or explain the following terms:

a. **Organismal ecology**

b. **Population**

c. **Population ecology**

d. **Community**

e. **Community ecology**

f. **Ecosystem**

g. **Ecosystem ecology**

h. **Landscape ecology**

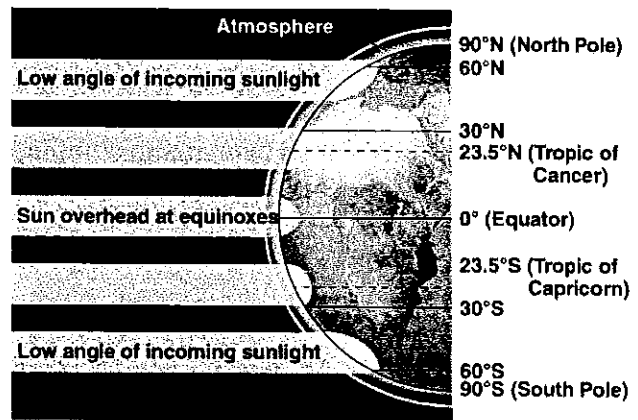
i. **Biosphere**

j. **Global ecology**

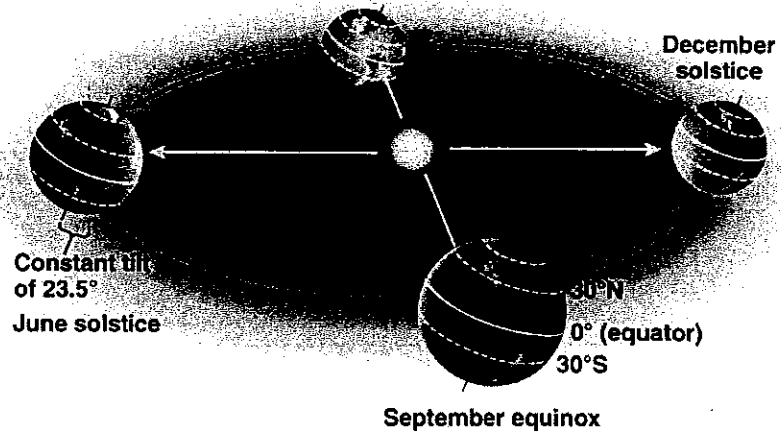
CONCEPT 52.1 EARTH'S CLIMATE VARIES BY LATITUDE AND SEASON AND IS CHANGING RAPIDLY

28. What is *climate*? What four factors are its components? Explain how each determine climate.

29. Study Figures 52.3 and 52.4 in your text, which summarize Earth's climate patterns and how they are formed. Explain how Earth's curvature and axis of rotation influence the amount of sunlight reaching a given area, and how these factors influence the temperature and precipitation in that area.



Latitudinal variation in sunlight intensity
March equinox



30. Explain the “rain shadow” effect.

31. How does the rainshadow effect determine biomes on the leeward side of a mountain range? Where does this occur in California?

CONCEPT 52.2 THE STRUCTURE AND DISTRIBUTION OF TERRESTRIAL BIOMES ARE CONTROLLED BY CLIMATE AND DISTURBANCE

32. What is a *biome*? How are they determined?

33. Figure 52.10 in your text shows a *climograph* for some major biomes in North America. What two abiotic factors shown here are most important in *determining the distribution of the biome*?

34. Describe each major terrestrial biome as to rainfall, temperature, location, and representative flora and fauna.

	Rainfall	Temp	Location	Flora/Fauna
Tropical Forest				
Desert				
Savanna				
Chaparral				
Temperate Grassland				

Northern Coniferous Forest/Taiga				
Temperate Broad leaf (deciduous) forest				
Tundra				

CONCEPT 52.3 AQUATIC BIOMES ARE DIVERSE AND DYNAMIC SYSTEMS THAT COVER MOST OF THE EARTH

35. What is the largest marine biome, and how much of Earth's surface does it cover?
36. As you read in this section and study Figure 52.13 in your test, you will encounter a number of new terms. Distinguish between each of the following pairs of terms:
- a. **Photic/aphotic**
 - b. **Benthic/pelagic**
 - c. **Oligotrophic/eutrophic**
 - d. **Littoral zone/limnetic zone**
 - e. **Zooplankton/phytoplankton**
 - f. **Neritic/abyssal**
37. Describe the process of lake turnover and the factors that cause this event.
38. What is the outcome of turnover?

39. Compare **oligotrophic** and **eutrophic** lakes.

CONCEPT 52.4 INTERACTIONS BETWEEN ORGANISMS AND THE ENVIRONMENT LIMIT THE DISTRIBUTION OF SPECIES

40. What role does dispersal play in the study of the distribution of species?

41. Read this section carefully to understand the different types of experiments and observations that help explain the distribution of species. As you conclude this section, list five examples of *biotic factors* that may influence species distribution.

42. List five **abiotic** factors. Include an example and description of each factor's influence on the living organisms.

CHAPTER 53: POPULATION ECOLOGY

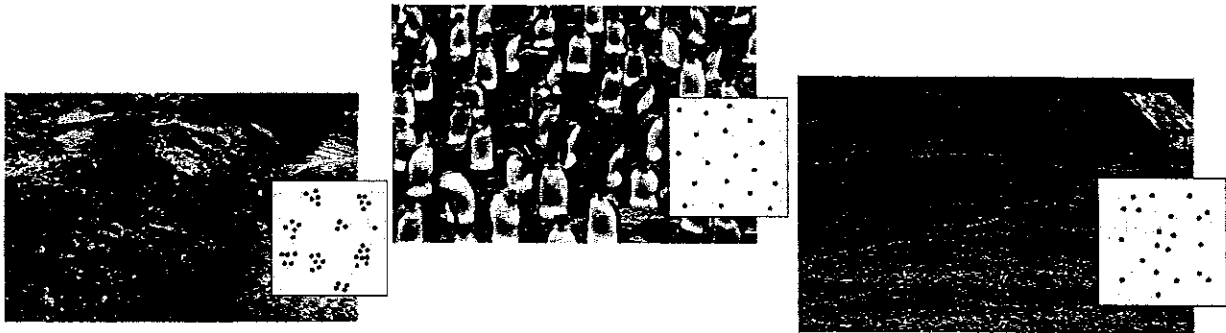
CONCEPT 53.1 DYNAMIC BIOLOGICAL PROCESSES INFLUENCE POPULATION DENSITY DISPERSION, AND DEMOGRAPHICS

43. What is the difference between density and *dispersion*?

Be able to calculate the estimated the size of a population using the Mark-Recapture Method

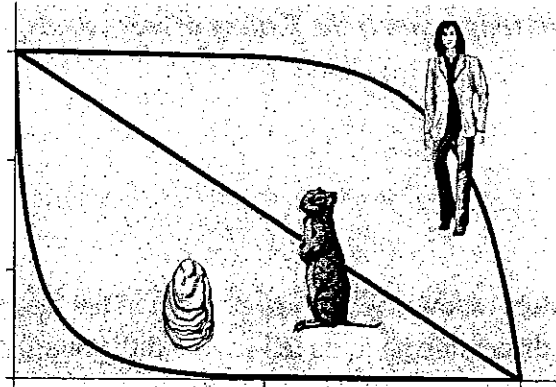
44. Explain the impact of *immigration* and *emigration* population density. (To avoid confusion between these two terms, It might help to use this memory trick: *immigration is the movement Into a population. While emigration is the Exiting of individuals from a population.*)

45. Label the dispersion pattern shown by each population in the figure below. Second, and most important, what do the dispersion patterns tell us about the population and its interactions?



46. Is your biology class a cohort? Explain.

47. **Survivorship curves** show patterns of survival. In general terms, survivorship curves can be classified into three types. Using the figure below, **label** and **explain** the three idealized survivorship patterns. [these appear on AP Biology and SATII exams]



48. What does a reproductive table show?

CONCEPT 53.2 THE EXPONENTIAL MODEL DESCRIBES POPULATION GROWTH IN AN IDEALIZED, UNLIMITED ENVIRONMENT

49. What will the per capita birth and death rates be in a population that is demonstrating *zero population growth*?

50. What does it mean for a population to be in *exponential population growth*?

51. What are two examples of conditions that might lead to *exponential population growth* in natural populations?

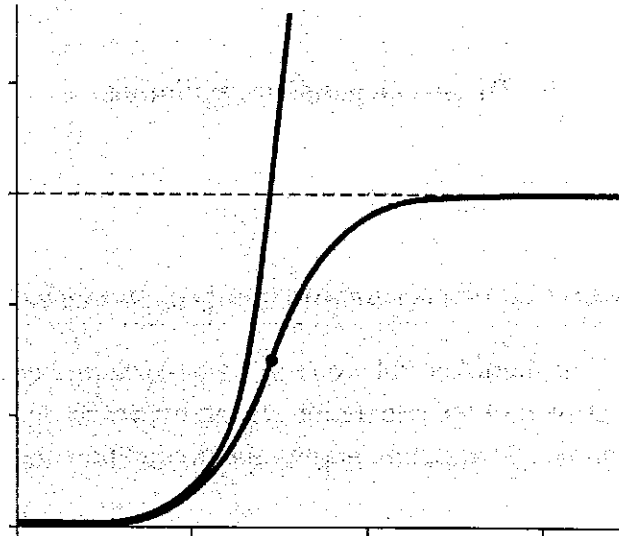
CONCEPT 53.3 THE LOGISTIC MODEL DESCRIBES HOW A POPULATION GROWS MORE SLOWLY AS IT NEARS ITS CARRYING CAPACITY

This section will introduce the equations used to calculate the **change in population size** and **exponential population growth**. You need to be able to use the formula (they are given to you on the exam)—I will give you a separate worksheet on this before the exam.

52. What is *carrying capacity*?

53. What are six examples of limiting resources that can influence carrying capacity?

54. Use the diagram below and analyze each pattern of growth. Label the graph. Describe the initial and final rates of growth **and** factors that would contribute to each pattern.



CONCEPT 53.4 LIFE HISTORY TRAITS ARE PRODUCTS OF NATURAL SELECTION

55. On what is the *life history* of an organism based?

56. What three variables form the life history of a species?

57. Explain the difference between *semelparity (big-bang reproduction)* and iteroparity (*repeated reproduction*) as life history strategies.
58. The end of this concept attempts to bring together the idea of life histories and growth models. This is done with the introduction of two new terms: ***K-selection and r-selection***. Explain the ideas behind the creation of these two terms.

CONCEPT 53.5 MANY FACTORS THAT REGULATE POPULATION GROWTH ARE DENSITY DEPENDENT

59. Compare and contrast these two terms:
- a. **Density-independent regulation:**

- b. **Density-dependent regulation:**

CONCEPT 53.6 THE HUMAN POPULATION IS NO LONGER GROWING EXPONENTIALLY BUT IS STILL INCREASING RAPIDLY

60. You should be able to look at *age-structure graphs* and make predictions about the future growth of the population. Using Figure 53.24 in your text, describe the key features for the three age-structure graphs and predict how the population of each country will grow.

CHAPTER 54: COMMUNITY ECOLOGY

CONCEPT 54.1 COMMUNITY INTERACTIONS ARE CLASSIFIED BY WHETHER THEY HELP, HARM, OR HAVE NO EFFECT ON THE SPECIES INVOLVED.

61. What is a community? List six organisms that would be found in the UNI or Turtle Rock community.
62. This section will look at **interspecific interactions**. Be clear on the meaning of the prefix! To begin, distinguish between **intraspecific** competition and **interspecific** competition. Give an example of each.
63. What is G.F Gause's competitive **exclusion principle**? Give one example. *[the example given in your book is a common example used on exams]*
64. Define ecological niche.
65. What is the difference between the **fundamental niche** and the **realized niche**?
66. Compare the two types of mimicry and give an example of each that is not listed in your textbook (look up the terms online and find another example):
- Batesian**
 - Müllerian**

67. What is **herbivory**?

68. Given two examples of **aposematic coloration** and explain how this is helpful to a prey organism.

69. Describe and give an example of each of the following interactions:

a. Symbiosis

b. Parasitism

c. Mutualism

d. Commensalism

Your text uses +/-/0 symbols to indicate how interspecific interactions affect survival and reproduction of the two species. Use these notations for each of these interactions—add these labels to the selections above.

CONCEPT 54.2 DIVERSITY AND TROPHIC STRUCTURE CHARACTERIZE BIOLOGICAL COMMUNITIES

70. What is species diversity? What are its two components? Why is it important?

71. What does an ecologist summarize in a food web?

72. Know the levels of **trophic structure** in food chains. Give a food chain here, including four links that might be found in a coniferous forest community, and tell the level for each organism.

73. How is a **keystone species** different from a dominant species?

80. Use this model to describe how an island's size and distance from the mainland affect the island's species richness.

CONCEPT 54.5 PATHOGENS ALTER COMMUNITY STRUCTURE LOCALLY AND GLOBALLY.

81. What is a vector? List three examples.

CHAPTER 55: ECOSYSTEMS AND RESTORATION ECOLOGY

82. What is an ecosystem?

83. Where does energy enter most ecosystems? How is it converted to chemical energy and then passed through the ecosystem? How is it "lost"?

55.1 PHYSICAL LAWS GOVERN ENERGY FLOW AND CHEMICAL CYCLING IN ECOSYSTEMS

84. List three groups of organisms that are **photosynthetic autotrophs**.

85. What are the primary producers of the deep-sea vents?

86. This concept reviews trophic relationships. Know all terms in your textbook that are bolded. What are trophic levels? What is always at the first trophic level?

87. What are **detritivores**? What is their important in chemical cycling? Give some examples of detritivores.

88. State the trophic level of each of the following:

- a. Cow:
- b. Grass:
- c. Man:
- d. Mushroom:

CONCEPT 55.2 ENERGY AND OTHER LIMITING FACTORS CONTROL PRIMARY PRODUCTION IN ECOSYSTEMS

89. What is **primary production**? Distinguish between **gross primary production** and **net primary production**.

90. Which ecosystem would tend to have a greater biomass/unit area, a prairie or a tropical rain forest? Explain.

91. Phytoplankton growth can be increased by additional nitrates and phosphates. What are common sources of each of these?

92. What are these nutrients called then?

93. What is **eutrophication**? What are factors that contribute to eutrophication?

94. How then are eutrophication and a eutrophic lake similar? (eutrophic lakes were discussed on page 1159)

CONCEPT 55.3 ENERGY TRANSFER BETWEEN TROPHIC LEVELS IS TYPICALLY ONLY 10% EFFICIENT

95. Generally, what percentage of energy available at one trophic level is available at the next?

96. Consider a food chain with 1,000 joules (an energy unit) available at the producer level. If this food chain is:

grass → grasshopper → lizard → crow

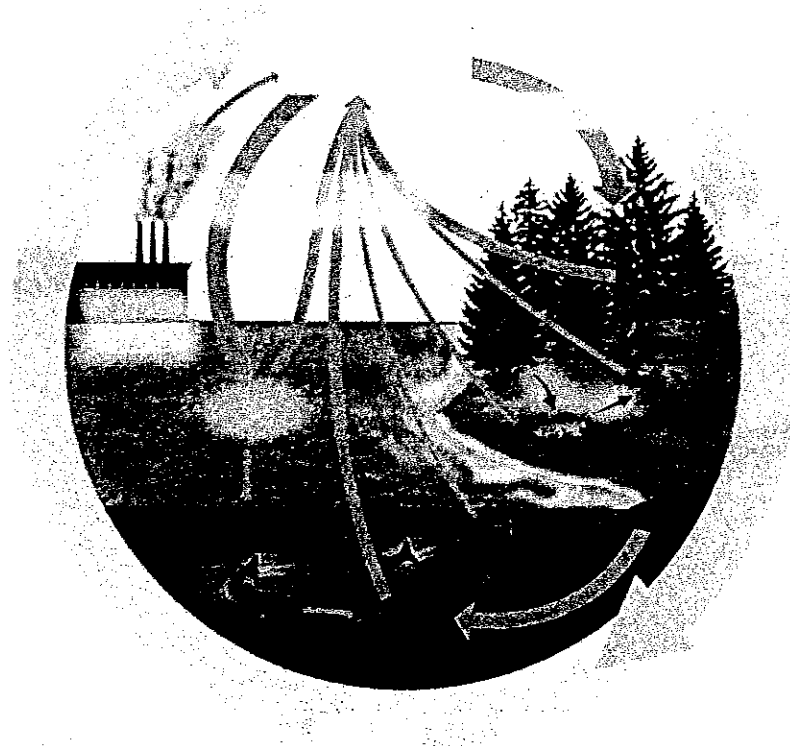
how much energy is found at the level of the crow?

Show your work here.

97. How are the pyramids of energy and the pyramids of biomass related?

CONCEPT 55.4 BIOLOGICAL GEOCHEMICAL PROCESSES CYCLE NUTRIENTS AND WATER IN ECOSYSTEMS

98. Use this figure to describe the **CARBON CYCLE**. In doing so, explain how carbon enters the living system and how it leaves, indicate the role of microorganisms in the cycle, and identify the reservoir for carbon. Do this on the sides of the diagram.



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99. Write the equation for photosynthesis here:

100. Write the equation for cellular respiration here:

101. Use the following diagram to describe the **NITROGEN CYCLE**. In doing so, indicate the role of microorganisms in nitrogen fixation, nitrification, and denitrification. Go back to figure 27.17 and *identify the type of bacteria* that can carry out these processes. Include them in on your diagram.

