

Dear Students and Parents,

Welcome to AP Biology! The course that you have chosen may be one of the most challenging, demanding and exciting courses that you have taken so far in your school career. You are studying biology at time of many scientific advances. Perhaps more new knowledge is being realized today in biology than in any other area of science. AP Biology is an intense and comprehensive, college-level course that follows a strict outline and schedule. It was designed by a select group of college professors and high school science teachers to be equivalent to an introductory college biology course including lectures, discussions, and laboratory investigations. At Bowie High, Advanced Placement courses provide students the opportunity to try their hands/minds at college-level materials and requirements.

We use a college text, college labs, and a comprehensive college curriculum. As such, we will not be able to consider all of general biology in detail between September and May. The pace of the class will be rapid; at times it will boggle your mind! It will be of utmost importance to consistently keep up to date with the text readings, class work, and laboratory assignments. The pace will be similar to that of a college laboratory course. **Much study and review will have to be done on your own, outside of class.**

We do not have the luxury of time so, to overcome the time constraints, I have posted copies of the Ecology Unit portion of the text used for this course. In this packet, there are suggestions for reading and outlining the text and summer study questions to answer that will enable students to develop an understanding of the material. By giving the text and questions out over the summer, students will be able to become familiar with reading a college level text. This will be our first unit in August (covered very quickly), and **there will be a pre-test on the material on the 1st day of school and a Unit Test the second week.**

For the summer packet, you will receive the following:

- 1) An introductory parent/student letter
- 2) The AP Biology Summer Assignment Timeline
- 3) The Ecology Booklet for Chapters 34-37
- 4) Directions for Recommended Reading, Outlining, and Vocabulary for the Ecology Unit
- 5) Four (4) Reading Comprehension Sheets (RC) for Chapters 34-37 and one scan-tron
- 6) An **Ecology Story Book Instruction Sheet**
 - ☛ You will need to self-evaluate your project PRIOR to turning it in.

Here are some key points to remember when completing the assignments:

- ☛ Follow the Timeline. Ecology Essays from the RC sheets are **divided during the summer and must be submitted via e-mail by each DUE DATE**. The scan-tron and Ecology Story Book are due **AT THE BEGINNING OF CLASS ON Monday, August 24, 2009**. On the first day of school, the first item of business will be to collect the scan-tron and Ecology Story Book (I will not accept Ecology Essays). If you are present at any time during the period which an assignment is to be collected, it is due when called for – not at the end of the period, not 5 minutes after it is called for.
- ☛ Assignments are divided during the summer. I encourage you to pay attention to the timeline and follow it closely. **ASSIGNMENTS WILL NOT BE ACCEPTED LATE** - no partial credit, no late grade. A grade of 0 will be given for any assignment not submitted on time. No exceptions will be made to this.
- ☛ You have to learn the ecology material on your own. You need to prepare accordingly. Creating the outline/notes and flash cards is only the first part. Studying your outline, notes, flash cards, and text is a very important part.
- ☛ There will be a multiple choice and essay pre-test on these chapters the first class session. **THIS ASSESSMENT WILL COUNT AS A TEST GRADE.**

I hope that you will support our efforts to enhance our students' science education. The summer reading and review questions will help us prepare for the May 2010 AP Biology test. I know you will join with us in our goal to provide a quality education for our young people and I thank you in advance for your assistance. If you have any inquiries into this matter, please contact me at sheikis.jenkins@pgcps.org. Thank you.

Sincerely,



Sheikisha Jenkins
AP Biology Teacher

AP Biology Summer 2009 Assignment

Summer Assignments Timeline & Due Dates

We do not have the luxury of time so, to overcome time constraints, I have assigned a series of assignments that include multiple choice and essay questions, ecology project, and recommended readings, outlines, and flash cards which will enable students to develop an understanding of the material. Ecology will be our first unit in August (covered very quickly), and **there will be a pre-test on the material on the 1st day of school and a Unit Test the second week.**

Assignments are divided during the summer. I encourage you to pay attention to the timeline and follow it closely. Remember, **ASSIGNMENTS WILL NOT BE ACCEPTED LATE** - no partial credit, no late grade. A grade of 0 will be given for any assignment not submitted on time. No exceptions will be made to this. So be sure to pay close attention to the timeline below so you do not miss deadlines:

Assignment Title	Due Date	Location	Point Value
Chapter 34 Ecology Essay	July 10 th	E-mail (sheikis.jenkins@pgcps.org)	30 pts
Biome Selection for Ecosystem Story Book	July 13 th	E-mail (sheikis.jenkins@pgcps.org)	N/A
Chapter 35 Ecology Essay	July 24 th	E-mail (sheikis.jenkins@pgcps.org)	30 pts
Chapter 36 Ecology Essay	August 7 th	E-mail (sheikis.jenkins@pgcps.org)	30 pts
Chapter 37 Ecology Essay	August 14 th	E-mail (sheikis.jenkins@pgcps.org)	30 pts
Ecology Multiple Choice Questions (Scan-tron)	August 24 th	In class	120 pts
Ecosystem Story Book	August 24 th	In class	150 pts
Chapters 34-37 Outline	August 24 th	In class	N/A

Ecology Essays from the RC sheets are **divided during the summer and must be submitted via e-mail by each DUE DATE**. The Scan-tron and Ecology Story Book are due **AT THE BEGINNING OF CLASS ON Monday, August 24, 2009**.

On the first day of school, the first item of business will be to collect the scan-tron and Ecology Story Book (I will not accept Ecology Essays). If you are present at any time during the period which an assignment is to be collected, it is due when called for – not at the end of the period, not 5 minutes after it is called for.

After collecting Summer work I will administer the Ecology Pre-Test, a multiple choice and essay exam on Chapters 34-37. **THIS ASSESSMENT WILL COUNT AS A TEST GRADE.** I expect that you learn the ecology material on your own, thus you need to prepare accordingly. Creating outlines/notes and flash cards is only the first part. Studying your outline, notes, flash cards, and text is also required. Although Ecology Outlines will not be scored, you will be permitted to use them on the Ecology Pre-Test on the first day of school, as long as they meet the criteria.

AP Biology Summer 2009 Assignment

Recommended Summer Reading/Outlines/Vocabulary (Ecology Unit)

Worth: NO POINT VALUE

The following summer readings, outlines, and flash cards are highly recommended, and will help you get a jump-start on the first unit of the course. Recall there will be an Ecology pre-test on the first day of school, for which you will be permitted to use your outlines and this assessment will count as your first test grade. Ecology Outlines are to be **NEATLY HANDWRITTEN**. Not typed. If outlines are illegible and/or typed, they will not be permitted during the exam. Every student can write legibly if time is invested.

Purpose: This assignment will allow students to become familiar with utilizing a college-level text to begin their study of Advanced Placement Biology. By completing this unit, we will be able to move forward more quickly in order to complete the necessary curriculum by the May 2010 testing date.

What the students will do: Students should read chapters 34-37 in the Ecology Unit portion of: *Biology Concepts and Connections (5th ed.)* by Campbell, Reece, Taylor, and Simon and create chapter outlines or concept maps that correspond to the study of Ecology. It is impossible to give a length guideline for these outlines/concept maps, because some concepts will require longer responses than others in order to be complete. Students should create outlines/concept maps in enough detail that they will understand their study guides later, since they will use these as a study aid in preparation for the Ecology pre-test, Ecology Unit Test, and finally the AP Exam. Students will also complete flash cards for the Ecology Unit in order to increase science literacy. Biology is often referred to as a "foreign language" thus learning and utilizing vocabulary to express biological ideas and understanding is important to your success in this class. While completing this assignment feel free to consult sources other than your book, if you feel your need more information.

Directions: Read & create your own personal, individualized outline/notes on Chapters 34-37. Do not copy from any source - create yourself. Alternately you could create concept maps of the chapters. If you decide to create concept maps, you may subdivide the chapter into as many maps as you see fit rather than creating one enormous map.

Your outlines/ notes will be collected and examined carefully before the pre-test. This is where you need to take special note of the terms "personal" and "individualized". Taking into account that you are all reading the same book, these assignments **MUST** be done by you and only you. Working together and helping each other to understand and clarify the concepts is encouraged, but when it comes to choosing the words and creating sentences that go on the paper, it must be your work only. Outlines, of BOTH PARTIES, will be confiscated before the pre-test, for work that common sense indicates is not completely original.

Evaluation: These outlines/concept maps and flash cards will not be assessed for a grade; however a **pre-test on the material will be given on the 1st day of school, for which you will be permitted to use your outlines/concept maps.**

TIPS FOR WRITING YOUR CHAPTER OUTLINES

The purpose of an outline is to develop a study tool, which allows you to boil down all the material you're dealing with into a **manageable, organized** list. Actually, outlines are more effective if you don't think of them as lists at all, but instead as **groupings of facts and concepts based on their relationships.**

Here's an example:

I. Internet pioneers

A. Hackers – programmers

1. Vint Cerf
 - a. helped build one of the first Net protocols and interfaces in late 1960s
 - b. Now VP at MCI Worldcom
2. Tim Berners-Lee
 - a. Developed the World Wide Web in the mid-1990s

B. Crackers - users who break into others' systems to look around or make mischief (often called "hackers," though the original hackers hate this)

1. Kevin Mitnick
 - a. legendary for cracking into Defense Dept. and other systems
 - b. Just finished serving sentence in federal prison

You'll find that many of the topics we study in biology can be grouped into such arrangements. Rather than trying to memorize lists, you'll be connecting concepts together on paper that you'll want to associate together later when you take the exam. If you look again at the **table of contents in your textbooks**, and even the **breakdowns of the chapters** themselves, you'll notice that they're arranged in this manner. By putting together your outline yourself, you'll be better able to remember all the items and how they relate to each other.

ECOLOGY & ANIMAL BEHAVIOR VOCABULARY

- | | |
|--|-------------------------------|
| 1. Population | 44. Nitrogen Cycle |
| 2. Community | 45. Nitrogen-fixing Bacteria |
| 3. Ecosystem | 46. Nitrifying Bacteria |
| 4. Biosphere | 47. Denitrifying Bacteria |
| 5. Biotic Factors | 48. Eutrophication of Lakes |
| 6. Abiotic Factors | 49. Acid Rain |
| 7. Properties of Populations | 50. Biological Magnification |
| 8. Dispersion | 51. Global Warming |
| 9. Survivorship Curves | 52. Depleting the Ozone Layer |
| 10. Food Chain | 53. Habitat Destruction |
| 11. Food Pyramid | 54. Biotic Potential |
| 12. Trophic Efficiency | ----- |
| 13. Population Growth | 1. Fixed Action Pattern |
| 14. Density Dependent Factors | 2. Learning |
| 15. Density Independent Factors | 3. Habituation |
| 16. R-Strategists | 4. Associative Learning |
| 17. K-Strategists | 5. Operant Conditioning |
| 18. Carrying Capacity | 6. Classical Conditioning |
| 19. Biomes | 7. Imprinting |
| 20. Marine | 8. Cooperation |
| 21. Tropical Rain Forest | 9. Agnostic Behavior |
| 22. Desert | 10. Dominance Hierarchies |
| 23. Temperate Grasslands | 11. Territoriality |
| 24. Temperate Deciduous Forest | 12. Altruism |
| 25. Taiga | 13. Karl Von Frisch |
| 26. Tundra | |
| 27. Gause's Principle of Competitive Exclusion | |
| 28. Ecological Niche | |
| 29. Character Displacement | |
| 30. Resource Partitioning | |
| 31. Competition | |
| 32. Predation | |
| 33. Mutualism (symbiosis) | |
| 34. Commensalism (symbiosis) | |
| 35. Parasitism (symbiosis) | |
| 36. Symbiosis | |
| 37. Plant Defenses | |
| 38. Animal Defenses | |
| 39. Aposematic Coloration | |
| 40. Batesian Mimicry | |
| 41. Mullerian Mimicry | |
| 42. Water Cycle | |
| 43. Carbon Cycle | |

AP Biology Summer 2009 Assignment

Reading Comprehension Sheet (Ecology Unit - Ch. 34)

Worth: 50pts

The following multiple choice and essay questions will help you check your understanding for Ch 34. This assessment will count as your first assignment grade.

Directions: Each of the Ecology chapters needs to be studied and understood. Below is a Reading Comprehension Sheet for chapter 34. You need to complete the multiple choice section on Part 1 of the scan-tron sheet provided and the ecology essays on your own paper. **Answers to the ecology essays should be typed and submitted via e-mail (sheikis.jenkins@pgcps.org) no later than July 10th.** The same policy about "personal" and "individualized" mentioned in the Welcome Letter also applies to this assignment. This assignment will be collected and graded.

I. Multiple Choice (20 pts)

- What is the primary source of energy for hydrothermal vent communities?
 - the heat of the water emerging from the vents
 - oxidation of petroleum compounds from the vent water
 - oxidation of hydrogen sulfide from the vent water
 - reduction of sulfates from the vent water
 - reduction of carbon dioxide from the vent water
- Which of the following could *not* be a topic for a community-level study of a hydrothermal vent ecosystem?
 - the interactions between tube worms and the bacteria they harbor
 - the cooperation between two parasitic protozoan species that both inhabit the same crab host
 - evolution of bacteria in response to changing vent water composition
 - the predation of clams by a type of starfish
 - the competition between clams and worms for space near hydrothermal vents
- In which of the following choices are levels of organization arranged from most to least inclusive?
 - community, ecosystem, population
 - ecosystem, community, population
 - population, ecosystem, community
 - population, community, ecosystem
 - community, population, ecosystem
- Which level of ecologic organization incorporates abiotic factors?
 - community
 - ecosystem
 - population
 - species
 - symbioses
- While on a walk through a forest you notice birds on trees, earthworms in the soil, and fungi on the bark of trees. Based on this you can conclude that each of these organisms occupies a different
 - habitat.
 - biome.
 - ecosystem.
 - biosphere.
 - abiome.
- Rachel Carson's book *Silent Spring* deals with the
 - 1985 baseball strike.
 - environmental effects of pesticides.
 - effects of lynx predation on snow hare populations.
 - hydrological cycle.
 - fate of tropical rain forests.
- The immediate results of the widespread use of pesticides and fertilizers in the 1950's included
 - dramatic increases in crop yields and marked reductions of diseases such as malaria.
 - the increased spread of malaria and other insect-borne diseases.
 - terrible declines in agricultural productivity due to dramatic increases in the number of crop pests.
 - global declines in undesirable pests such as mice, rats, crows, and sharks.
 - dramatic declines in crop pests but with little impact to agricultural yields.
- Which of the following environmental factors usually has the greatest direct effect on an organism's rate of water loss by evaporation?
 - soil type
 - wind
 - fires, hurricanes, and tornadoes
 - moisture
 - None of the choices are correct.
- In many dense forests, plants living near the ground level engage in intense competition for
 - oxygen.
 - water.
 - carbon dioxide.
 - sunlight.
 - None of the choices are correct.
- Which of the following is the primary reason why a hot spring might kill a fish placed in it, even though certain bacteria thrive there?
 - The high temperatures denature most of the fish's enzymes; but the bacteria have enzymes adapted to these temperatures.
 - Fish cannot feed directly on bacteria but the bacteria can feed on dead fish.
 - At hot-spring temperatures, the metabolic activity of the fish's cells is so rapid that the animal runs out of food reserves.
 - Bacterial growth at high temperatures is so rapid that it deoxygenates the water and kills the fish.
 - The bacteria in hot springs are poisonous to fish.
- The adaptations of pronghorns
 - to open country can be a disadvantage in a densely forested environment.
 - include a reflective coat, an ability to find small pools of water, and chemical defenses against most predators.

- C) to the open plains and shrub deserts of North America have helped them spread to nearly every continent.
 D) demonstrate that meeting the demands of local environmental conditions helps organisms extend their ranges to other types of environments.
 E) All of the choices are correct.
- 12) A sperm whale in the middle of the Atlantic Ocean is in which oceanic zone?
 A) intertidal B) benthic C) neritic D) pelagic E) estuarine
- 13) *Except* near hydrothermal vents, the communities of the oceanic aphotic zones get their energy mainly from:
 A) photosynthesis by local phytoplankton. B) photosynthesis by local zooplankton.
 C) oxidation of sulfur by sulfur bacteria. D) oxidation of silicates by silicate bacteria.
 E) a rain of dead organic matter from above.
- 14) Under the conditions known as El Niño, the mineral nutrient content of the seawater off the coast of Peru declines to very low levels. What effect will this likely have on marine life in the area?
 A) The lower the levels of minerals, the less polluted the water; hence, most populations will increase.
 B) It will result in toxic red tides, which will reduce the populations of many species.
 C) It will reduce the abundance of phytoplankton and, consequently, the abundance of other organisms.
 D) It will increase the productivity of phytoplankton and, therefore, the productivity of other organisms by decreasing salinity.
 E) It will increase the productivity of phytoplankton and, therefore, the productivity of other organisms by allowing sunlight to penetrate deeper into the ocean.
- 15) Usually, at its source a river _____ compared with farther downstream.
 A) has less phytoplankton B) is warmer C) is murkier D) is wider E) flows more slowly
- 16) Species in widely separated biomes often appear similar because of
 A) convergence. B) coevolution. C) mutations. D) evolutionary drift. E) dominance.
- 17) A photograph of a Victorian trophy room shows the heads of 15 species of hoofed mammal, all shot within a day's walk of a single hunting camp in Africa. This camp was probably located in
 A) tropical rain forest. B) tropical deciduous forest. C) chaparral. D) savanna. E) desert.
- 18) Which of the following choices does *not* correctly pair a biome with some of its characteristics?
 A) temperate forest — cold winters, moderate to high rainfall, predominantly dicot vegetation
 B) temperate grassland — cool to cold winters, dry summers
 C) chaparral — mild, rainy winters; long, hot, dry summers
 D) savanna — long, cold winters, vegetation dominated by conifers
 E) tundra — very cold winters; only the upper layer of the soil thaws during summer
- 19) You are reading the journal of an amateur naturalist who visited the Sonoran Desert in the last century. Which of the following descriptions of desert plants would you tend to doubt?
 A) a plant whose seeds will not germinate unless soaked
 B) a perennial that flowers only after years of vegetative growth and produces a large number of seeds
 C) a late winter hillside covered with wildflowers
 D) a common annual that produces one large seed per plant
 E) a moth-pollinated perennial
- 20) Why is the runoff from fertilized agricultural fields, even if free of pesticides, often harmful to the ecosystems of temperate lakes?
 A) Fertilizer compounds are toxic to fish.
 B) The runoff causes a surface algal bloom, which reduces the lake's oxygen by cutting off the sunlight and fouling the water with dead organic matter.
 C) The runoff raises the levels of inorganic nutrients in the surface waters to levels that are toxic for algae and other lake organisms.
 D) Runoff water pools at the lake's bottom, where the fertilizer compounds react with materials in the sediment to form toxic substances.
 E) The runoff is acid, and acidification kills key lake organisms.

II. Ecology Essays (30pts)

1. Living organisms play an important role in the recycling of many elements within an ecosystem. Discuss how various types of organisms and their biochemical reactions contribute to the recycling of both carbon and nitrogen in an aquatic ecosystem and terrestrial ecosystem. Include in your answer two ways in which human activity has an impact on both of the nutrient cycles.

(You will also need to refer to Chapter 37 before answering this essay.)

AP Biology Summer 2009 Assignment

Reading Comprehension Sheet (Ecology Unit - Ch. 35)

Worth: 55pts

The following multiple choice and essay questions will help you check your understanding for Ch 35. This assessment will count as your first assignment grade.

Directions: Each of the Ecology chapters needs to be studied and understood. Below is a Reading Comprehension Sheet for chapter 35. You need to complete the multiple choice section on Part 2 of the scan-tron sheet provided and the ecology essays on your own paper. **Answers to the ecology essays should be typed and submitted via e-mail (sheikis.jenkins@pgcps.org) no later than July 24th.** The same policy about "personal" and "individualized" mentioned in the Welcome Letter also applies to this assignment. This assignment will be collected and graded.

I. Multiple Choice (25 pts)

- The evolutionary cause of behavior is called the
 - evolutionary schematic.
 - adaptive motivator.
 - selected advantage.
 - proximal cause.
 - ultimate cause.
- Apanteles* wasps lay their eggs in caterpillars of the genus *Pieris*, and egg-laying behavior is elicited in gravid *Apanteles* wasps by the sight of a *Pieris* caterpillar. In this situation, the sight of the caterpillar constitutes the
 - imprinting stimulus.
 - conditioning stimulus.
 - proximate cause of the behavior.
 - ultimate cause of the behavior.
 - reward.
- Which one of the following statements is *false*?
 - Innate behaviors are performed the same way in all members of a species.
 - Fixed action patterns are learned behavior sequences.
 - A sign stimulus triggers a fixed action pattern.
 - Innate behaviors are under strong genetic control.
 - Innate behaviors are often crucial to the survival of a species.
- When nest building, a female Fisher's lovebird cuts long strips of vegetation and carries them to the nest site one at a time in her beak. The peach-faced lovebird cuts short strips and carries them to the nest tucked under back feathers. Hybrid offspring cut intermediate-sized strips and attempt to tuck them under back feathers before carrying them in their beak. What does this demonstrate about behavior?
 - Behavior can be learned from parents.
 - There is a genetic basis to behavior.
 - Environment is important in forming behaviors.
 - Lovebirds can be trained easily.
 - The smaller the strip, the easier it is to carry.
- Many rats were tested for their ability to learn a maze. The average number of errors for a total of 14 trials was 64 per rat. The rats that made the fewest errors were bred to each other, and the offspring were tested in a similar way. This process was repeated for seven generations, at which point the average number of errors for 14 trials was 36. This experiment demonstrates that
 - learned behavior cannot be inherited.
 - maze-learning ability has a genetic basis.
 - maze-learning ability depends mainly on early contact with adept parents.
 - natural selection has a role in the evolution of fixed action patterns but not in the evolution of behavior involving learning.
 - maze-learning ability increases with increasing homozygosity of the genome.
- In a particular songbird species, you are told, the song of males has an innate component but is also largely learned: Nestling males imprint on their father's song, and then sing it themselves when they reach sexual maturity. Which of the following observations would lead you to doubt this information?
 - A male chick reared in isolation grows up to sing a rudimentary version of his species' song.
 - A male chick reared in isolation and introduced as a subadult into an aviary containing normal males of his species sings his species' song.
 - A male chick who is reared in isolation but hears tape recordings of his species' song grows up to sing normally.
 - A male chick who is reared in isolation but hears tape recordings of a different species' song grows up to sing that species' song.
 - A male chick fostered in the nest of a different species grows up to sing the song of its foster species.
- In an experiment to test the hypothesis that salmon migrate by smell back to their home stream to spawn (reproduce sexually), an experimenter exposed 26,000 salmon fry to a dilute concentration of the odorous chemical morpholine during the period when they were most easily imprinted. These fish were then tagged, released into a tributary stream, and allowed to migrate. Which one of the following would *not* test whether the salmon use the smell of morpholine as a chemical cue to migrate back to their "home" stream, months later when the salmon are ready to spawn?
 - Morpholine should be released into the tributary stream from which the salmon migrated, and the number of returning salmon counted.
 - Morpholine should be released into a different tributary stream, and the number of salmon returning to that stream counted.
 - No morpholine should be added to the original tributary stream, but the number of returning salmon there should be counted.

D) All of the choices would be a good test.

8) A male turkey that imprinted onto a human at hatching is transferred as a subadult to a flock of "normal" turkeys. When this turkey reaches sexual maturity, he will probably try to court

- A) male, female, or immature turkeys indiscriminately. B) immature male turkeys.
C) mature female turkeys. D) humans. E) nothing.

9) A grayling butterfly will normally fly toward the sun. This is an example of

- A) kinesis. B) migration. C) phototropism. D) taxis. E) instinct.

10) After many hours of observation, Jennifer noticed that a squirrel in her backyard seemed to retreat up a certain tree every time it was frightened. At the base of that tree was a wheelbarrow. Jennifer wondered how the squirrel found the same tree each time.

Perhaps it simply knew to use the tree with the wheelbarrow. That night, Jennifer moved the wheelbarrow a few feet over and placed it against another tree. The next day, the squirrel retreated up the new tree, with the wheelbarrow resting at its base. This experiment suggests that the squirrel was using

- A) kinesis. B) spatial learning. C) imprinting. D) habituation. E) social learning.

11) A blue jay hides hundreds of nuts throughout the fall and finds them throughout the winter and spring. The blue jay is most likely finding the stored food by using

- A) kinesis. B) a cognitive map. C) imprinting. D) habituation. E) social learning.

12) The most extensive study of internal maps have involved animals that

- A) migrate. B) burrow extensive tunnels into the ground. C) hibernate.
D) engage in thermoregulation. E) build nests.

13) In England, at a time when milk was still delivered to doorsteps each morning in foil-capped glass bottles, a songbird called the great tit started pecking through the caps and drinking the cream in the necks of the bottles. This behavior spread through the great tit population in a matter of years. The emergence and spread of this behavior probably depended on

- A) habituation. B) trial and error plus habituation. C) trial and error plus imitation.
D) trial and error plus imprinting. E) habituation plus imitation.

14) A big difference between imitation and imprinting is that

- A) imprinting does not involve a reward. B) imprinting does not involve learning.
C) imitation does not involve learning. D) imitation does not involve a reward.
E) imitation is not limited to a sensitive period.

15) Behavior is an adaptation that enhances evolutionary fitness. Which type of learning behavior would be characteristic of the least specialized animals?

- A) association B) imprinting C) problem solving D) imitation E) social learning

16) You lose track of your friend in a store and now start looking for her. Which one of the following things that you could do represents the use of a search image?

- A) You ask a woman if she has seen anyone around this part of the store.
B) You think about what color clothing she wore and look for that color.
C) You go to the department in the store where your friend most likes to shop.
D) You call your friend's name.
E) You return to the last place you saw your friend.

17) An insectivorous bird has the choice of eating (1) meadow beetles, which are abundant and large but expose the bird to hawk predation; (2) under-a-rock beetles, which are large and fatty but hard to obtain; and (3) under-a-leaf beetles, which are easy to obtain but small. The bird has nestlings to feed. As an optimal forager, it will

- A) concentrate on meadow beetles and feed at dawn and dusk to avoid hawks.
B) concentrate on under-a-leaf beetles because they are easy and safe.
C) concentrate on under-a-rock beetles because they are energy-rich.
D) eat one kind of beetle at a time (first under-a-leaf, then meadow, then under-a-rock), switching to a new kind when the old kind becomes scarce.
E) eat all three kinds of beetles, balancing the energy spent obtaining each against the energy gained and the risks incurred.

18) The certainty of paternity is greatest in organisms that

- A) are promiscuous. B) are polygamous. C) have extensive parental care. D) use internal fertilization.
E) mate and lay eggs at the same time.

19) During the spring, male prairie chickens gather in open grassy areas and shuffle in a dance with their wings drooped, head erect, and tail feathers spread. The function of this dance is to

- A) frighten off smaller birds from the territory. B) select the showiest females to mate with.

- C) attract the attention of females. D) imprint the younger male birds.
E) teach courting behavior to younger male birds.
- 20) Which one of the following does *not* represent an example of territoriality?
A) Males of an antelope species gather daily on a mating ground during the mating season. Each male defends a specific, tiny segment of the ground.
B) Male chipmunks occupy areas that contain ranges of several females. A male chipmunk defends his area against other males but not against females.
C) Gannets breed in dense colonies. Each gannet defends the area within the beak's reach of its nest, but gannets feeding at sea are indifferent to each other.
D) Troops of monkey species use well-defined, widely overlapping ranges. Troops avoid encountering each other and are aggressive if they meet.
E) Male redwing blackbirds occupy and defend parcels of marsh. One or more females nest in each parcel, which provides food and nesting sites.
- 21) Which of the following would be an example of agonistic behavior?
A) A dog raises its hackles, bares its teeth, and stands high to appear threatening.
B) A honeybee does a waggle dance to indicate the direction of food.
C) A male ruffed grouse spreads its tail and beats its wings to attract a female.
D) Fireflies flash in a species-specific pattern. E) Ants mark their trails by releasing pheromones.
- 22) Agonistic behavior
A) usually causes serious injury to one or both of the combatants. B) increases the number of individuals who mate.
C) is used to establish dominance hierarchies. D) is the result of habituation. E) is rare among vertebrates.
- 23) In a particular lizard species, a territorial male deals with invading males by standing tall, erecting his crest, gaping, and, if necessary, biting. In which of the following situations would you *not* be surprised to find the same male depressing his crest and adopting a crouching posture with averted face?
A) upon encountering one of his own subadult offspring B) upon encountering any female of his own species
C) during courtship D) upon encountering a dachshund E) None of the choices are correct.
- 24) According to von Frisch's hypothesis about honeybee communication, information about food sources is usually communicated by returning foragers on a comb surface in the dark hive. Which of the following senses is *not* important to the bees in communicating and interpreting information in this situation?
A) sight B) taste C) touch D) hearing E) sense of the direction of gravity
- 25) From a sociobiological perspective, altruism is a behavior that
A) does not have a genetic basis. B) has the potential to enhance the altruist's fitness at a later point in time.
C) will always be selected against. D) occurs only in the social insects. E) can be viewed as a type of mental illness.

II. Ecology Essays (30pts)

- Define and explain the role of each of the following in social behavior.
 - Territoriality.
 - Dominance hierarchies.
 - Courtship behavior.
- Describe and give an example of each of the following. Include in your discussion the selection advantage of each.
 - Pheromones.
 - Mimicry.
 - Stereotyped behavior (instinct).
- Describe releasers, imprinting, and communications, as each of these terms relates to animal behavior. You may include in your answer a discussion of the classical studies of Nikolaas Tinbergen, Konrad Lorenz, and Karl von Frisch.

AP Biology Summer 2008 Assignment

Reading Comprehension Sheet (Ecology Unit - Ch. 36)

Worth: 60 pts

The following multiple choice and essay questions will help you check your understanding for Ch 36. This assessment will count as your first assignment grade.

Directions: Each of the Ecology chapters needs to be studied and understood. Below is a Reading Comprehension Sheer for chapter 36. You need to complete the multiple choice section on Part 3 of the scan-tron sheet provided and the ecology essays on your own paper. **Answers to the ecology essays should be typed and submitted via e-mail (sheakis.jenkins@pgcps.org) no later than August 7th.** The same policy about "personal" and "individualized" mentioned in the Welcome Letter also applies to this assignment. This assignment will be collected and graded.

I. Multiple Choice (30 pts)

- Which of the following is *not* an example of a population?
 - all of the organisms in your classroom
 - all of the students in your classroom
 - all of the female students in your classroom
 - all of the male students in your classroom
 - all of the people who study with you
- A group of individuals of a single species that occupy the same general area defines a
 - population.
 - community.
 - species.
 - subspecies.
 - clone.
- Assume that there are five alligators per acre in a swamp in northern Florida. This is a measure of the alligator population's
 - dispersion.
 - intrinsic rate of increase.
 - range.
 - equability.
 - density.
- The pattern of distribution for a certain species of kelp is clumped. We will expect that the pattern of distribution for a population of snails that live on the kelp would be
 - absolute.
 - clumped.
 - homogeneous.
 - random.
 - uniform.
- You drive through Iowa in the spring and notice that every fence post for 3 km has a male redwing blackbird on it defending its nesting territory. This is an example of
 - more birds than we need.
 - clumped distribution.
 - random distribution.
 - uniform distribution.
 - artificial selection.
- To obtain optimal production in a small garden, one should
 - plant seeds in rows with minimal spacing between rows.
 - plant seeds in clumps with large spaces between clumps.
 - plant seeds in a uniform pattern throughout the garden.
 - soak seeds overnight before planting in rows.
 - sow seeds randomly throughout the garden.
- A Type I survivorship curve is the result of which of the following life-history traits?
 - Parents provide extended care for their young.
 - Large numbers of offspring are produced.
 - Infant mortality is much greater than adult mortality.
 - Death rates are constant over the life span.
 - Most individuals have short life spans.
- A survivorship curve is a
 - graph that plots an individual's likelihood of reproducing as a function of age.
 - graph that plots an individual's likelihood of being alive as a function of age.
 - graph that shows the effect of predation on a prey population.
 - model for population growth that incorporates the concept of carrying capacity.
 - model for population growth that incorporates reproductive rates.
- A population of fungi in a yard produces 10 mushrooms in year 1, 20 in year 2, and 40 in year 3. If this trend continues, by year 5 there will be _____ mushrooms.
 - 20
 - 40
 - 80
 - 160
 - 320
- The maximum number of individuals a habitat can support is called the
 - reproductive potential.
 - carrying capacity.
 - community size.
 - density-dependent factor.
 - population growth.
- A newly mated queen ant establishes an ant nest in an unoccupied patch of suitable habitat. Assuming that no disasters strike the nest, which of the following types of equation is likely to best describe its population growth?
 - linear
 - quadratic
 - logarithmic
 - logistic
 - exponential
- A test tube is inoculated with 1×10^3 cells of a bacterial strain that has a generation time of 30 minutes. The carrying capacity of the test tube for this strain is 6×10^9 cells. What will the bacterial population be after 90 minutes of culturing?

- A) 3×10^3 B) 8×10^3 C) 9×10^3 D) 1×10^9 E) 1×10^{12}
- 13) If an ecosystem has a carrying capacity of 1,000 individuals for a given species, and 2,000 individuals of that species are present, we can predict that the population
- A) size is at equilibrium. B) size will decrease. C) will show a clumped dispersion pattern.
D) will show a uniform dispersion pattern. E) size will slowly increase.
- 14) A human population will achieve zero population growth if
- A) no couple has more than two children.
B) couples have an average of about 2.25 children each (to account for some children who do not survive to reproduce).
C) no couple has more than one child.
D) the birth rate equals the intrinsic rate of increase r .
E) the birth rate equals the death rate.
- 15) A tidal wave wipes out the entire population of mice living on an island. This is an example of
- A) Type III survivorship. B) a density-dependent effect.
C) why most island forms have evolved mechanisms for rapid dispersal. D) the effects of abiotic factors.
E) the interaction between density-dependent and abiotic factors.
- 16) The death by bubonic plague of about one-third of Europe's population during the fourteenth century is a good example of
- A) abiotic factors limiting population size. B) a density-dependent effect. C) a time lag.
D) a density-independent effect. E) carrying capacity.
- 17) Which of the following is most clearly a case of density-dependent population regulation?
- A) the summer drying of savanna grass for an insect that feeds on grass sap
B) a dangerous new flu strain that is transmitted among humans by sneezing
C) the first hard frost of fall for a population of annual morning-glory vines
D) the growth of shade trees for a population of sun-loving shrubs in an abandoned field
E) the occurrence of rainstorms for an opportunistic desert annual
- 18) In the logistic growth model, as population size increases,
- A) birth rates remain constant and the death rates increase. B) birth rates decline but the death rates remain steady.
C) birth and death rates increase. D) birth and death rates remain steady. E) birth rates decline and/or death rates increase.
- 19) An ecologist hypothesizes that predation by a particular owl species is the major factor controlling the population of a particular rabbit species. A good preliminary step in testing this hypothesis would be to determine
- A) whether populations of the rabbit that live outside the range of the owl have higher population densities.
B) whether the owls eat the rabbits. C) to which diseases the rabbit population is subject.
D) what food the rabbits eat. E) what habitats the rabbits and the owls occupy.
- 20) An ecologist hypothesizes that predation by a particular owl species is the major factor controlling the population of a particular rabbit species. If this hypothesis proves to be correct, which of the following population effects could be expected in this rabbit-owl pair?
- A) A fall in the owl population should cause a fall in the rabbit population.
B) A fall in the rabbit population should cause an increase in the owl population.
C) An increase in the incidence of disease in the rabbit population should not change the owl population.
D) An increase in the rabbits' food supply should not change the owl population.
E) An increase in the owl population should cause a fall in the rabbit population.
- 21) Which one of the following organisms best illustrates *K-selection*?
- A) the production of thousands of eggs every spring by frogs
B) mice that produce three litters of 10-15 babies in the course of a summer
C) a polar bear producing one or two cubs every three years
D) a species of weed that quickly spreads into a region of cleared trees
E) All of the choices are examples of *K-selection*.
- 22) Guppies from Trinidad form two distinct populations that differ in several life-history traits that appear to relate to the local predator populations, pike-cichlids or killifish. Which of the following experiments would test the heritability of these traits?
- A) Raise both populations with cichlids to see if the population of smaller, faster-maturing guppies reproduces more quickly.
B) Raise both populations without predators to see if they maintain their life-history traits.
C) Introduce cichlids into a habitat with killifish.
D) Provide additional food to the guppies from cichlid habitats to see if they will grow to the same size as guppies from the killifish habitat.
E) Grow both guppy populations together to see if they interbreed.

- 23) Which of the following will likely decrease a population's size?
A) improve the quality of the habitat
B) increase the amount of habitat
C) practice sustainable resource management
D) harvest populations below their carrying capacity
E) All of the choices will likely increase a population's size.
- 24) Which one of the following statements is *false*?
A) Integrated pest management uses a combination of biological controls, chemicals, and cultural methods to control agricultural pests.
B) Simply killing many individuals is often the best way to reduce the size of a pest population.
C) Most insecticides kill the pest and the pest's natural predators.
D) Prey species often have a higher reproductive rate than do predators.
E) Providing additional habitat or improving the quality of existing habitat usually raises the carrying capacity of a population.
- 25) The type of growth illustrated by the human race during the past 2,000 years is _____ growth.
A) exponential
B) logistic
C) equilibrial
D) Z-shaped
E) linear
- 26) The greatest crisis ever faced by humans is probably
A) the ozone hole.
B) global warming.
C) hazardous waste disposal.
D) air and water pollution.
E) human population growth.
- 27) The age structure diagram of a human population in a developed country like Sweden, which has a population growth rate near zero and in which neither birth rate nor death rate has changed much in the past lifetime, has the shape of
A) an hourglass.
B) a pyramid.
C) a rectangle tapering near the top.
D) a funnel.
E) a triangle with the point at the bottom.
- 28) What is the age structure of a population?
A) the curve that results when the likelihood of dying is plotted as a function of age
B) the curve that results when the likelihood of being alive is plotted as a function of age
C) the proportion of individuals in different age groups
D) the difference in the age distribution of a population at two different points in time
E) the structure of a population at different points on its growth curve
- 29) A country with an age structure diagram with a base smaller than most of the next higher levels is experiencing
A) a population explosion.
B) near zero population growth.
C) negative population growth.
D) logistic growth.
E) exponential growth.
- 30) In a developing nation, such as the United States during the nineteenth and early twentieth centuries, the introduction of public health improvements such as sewage systems, milk pasteurization, and childhood vaccination would have changed the shape of the age structure diagram in what way?
A) All levels of the pyramid would get wider by an equal amount.
B) The pyramid would widen disproportionately at the base.
C) The middle levels of the pyramid would widen disproportionately.
D) The upper levels of the pyramid would widen disproportionately.
E) The pyramid would get taller as people lived to ages not previously attained.

II. Ecology Essays (30pts)

1. A scientist working with *Bursatella leachii*, a sea slug that lives in an intertidal habitat in the coastal waters of Puerto Rico, gathered the following information about the distribution of the sea slugs within a ten-meter square plot over a 10-day period.

Distribution of Slugs within a ten-meter square plot	
<i>Time of Day</i>	<i>Average Distance between individuals (cm)</i>
Midnight	8.0
4 a.m.	8.9
8 a.m.	44.8
Noon	174.0
4 p.m.	350.5
8 p.m.	60.5
midnight	8.0

a. For the data above, provide information on each of the following.

- Summarize the pattern.
- Identify THREE physiological or environmental variables that could cause the slugs to vary their distance from each other.
- Explain how each variable could bring about the observed pattern of distribution.

b. Choose ONE of the variables that you identified and design a controlled experiment to test your hypothetical explanation. Describe results that would support or refute your hypothesis

AP Biology Summer 2009 Assignment

Reading Comprehension Sheet (Ecology Unit - Ch. 37)

Worth: 65 pts

The following multiple choice and essay questions will help you check your understanding for Ch 37. This assessment will count as your first assignment grade.

Directions: Each of the Ecology chapters needs to be studied and understood. Below is a Reading Comprehension Sheet for chapter 37. You need to complete the multiple choice section on Part 4 of the scan-tron sheet provided and the ecology essays on your own paper. **Answers to the ecology essays should be typed and submitted via e-mail (sheikis.jenkins@pgcps.org) no later than August 14th.** The same policy about "personal" and "individualized" mentioned in the Welcome Letter also applies to this assignment. This assignment will be collected and graded.

I. Multiple Choice (35 pts)

- 1) A community is made up of
 - A) potentially interacting populations of different kinds of organisms.
 - B) one species of organism living in one particular environment on Earth.
 - C) living organisms and their nonliving environment.
 - D) several ecosystems on one continent.
 - E) the factors that constitute an organism's niche.
- 2) The feeding relationships among the species of a community is the community's
 - A) niche.
 - B) diversity.
 - C) density.
 - D) richness.
 - E) trophic structure.
- 3) If an overlap develops between the ranges of two closely related species, and if the species occupy the same niche in the zone of overlap, what will probably happen in the zone of overlap?
 - A) A new species will arise by hybridization.
 - B) Both species will coexist, provided the environment in the zone of overlap is different from that in either individual range.
 - C) Both species will coexist, provided the environment in the zone of overlap is similar to that of one of the individual ranges.
 - D) The species will partition the zone so that half of it is added to the range of each species and there is no overlap.
 - E) One species will take over most or all of the zone of overlap.
- 4) In an ecosystem, you would most expect to find interspecific competition between
 - A) males and females of a species in which both sexes occupy the same niche.
 - B) populations of two species that occupy the same niche.
 - C) males of a species during the breeding season.
 - D) a prey species and its predator.
 - E) two wasp species that mimic each other's appearance.
- 5) According to the competitive exclusion principle, two species cannot continue to occupy the same
 - A) environmental habitat.
 - B) ecological niche.
 - C) territory.
 - D) range.
 - E) biome.
- 6) The sum total of a population's use of the biotic and abiotic resources of its habitat constitutes its
 - A) environment.
 - B) evolution.
 - C) distribution.
 - D) range.
 - E) niche.
- 7) The differentiation of niches that enables similar species to coexist in a community is called
 - A) resource partitioning.
 - B) the competitive exclusion principle.
 - C) interspecific competition.
 - D) niche competition.
 - E) resource reduction.
- 8) Which one of the following is *not* an example of predation?
 - A) a snapping turtle wiggling its worm-like tongue to lure in and consume a fish
 - B) a hawk swooping down quickly to capture, kill, and eat a prairie king snake
 - C) a goldfinch feeding on the seeds of a thistle plant
 - D) a rattlesnake ambushing and eating an unaware mouse as it runs along the top of a log
 - E) All of the choices are examples of predation.
- 9) Which of the following is an example of Batesian mimicry?
 - A) the resemblance of a harmless fly to a bee
 - B) the resemblance of the walking-stick insect (a kind of mantis) to the twigs of a tree
 - C) the resemblance of an African sunbird to a Central American hummingbird that occupies a similar niche
 - D) the resemblance of the western meadowlark to the eastern meadowlark
 - E) the similar appearance and black-and-gold coloration of many wasps
- 10) Which one of the following is an example of Müllerian mimicry?
 - A) a dark-colored snail with the same color as the plant on which it feeds
 - B) the yellow and black stripes on a bee and hornet
 - C) the bright coloration of a poison-arrow frog
 - D) the tail of a harmless caterpillar that appears to be the head of a snake
 - E) the branching root patterns of oak and hickory trees that increase the surface area for water absorption

- 11) Most plants have a variety of chemicals, spines, and thorns because the plants
 A) cannot run away from herbivores. B) feed on the organisms that try to eat them.
 C) are camouflaged into their surroundings. D) are adapted to attract herbivores. E) are relying upon Batesian mimicry.
- 12) The relationship between a cow and the cellulose-digesting bacteria in the rumen of its gut would best be described as
 A) predation. B) parasitism. C) mutualism. D) commensalism. E) interspecific competition.
- 13) The prokaryotes that cause tooth decay have a _____ relationship with humans.
 A) parasitic B) commensalistic C) mutualistic D) competitive E) ammensalistic
- 14) The relationship between cattle and the birds that eat insects stirred up by grazing cattle is an example of
 A) predation. B) parasitism. C) mutualism. D) commensalism. E) interspecific competition.
- 15) When a New England farm is abandoned, its formerly plowed fields first become weedy meadows, then shrubby areas, and finally forest. This sequence of plant communities is an example of
 A) evolution. B) a phylogenetic trend. C) a trophic chain. D) secondary succession. E) genetic drift.
- 16) During ecological succession, the species composition of a plant community generally
 A) changes from a diverse community in which many plants are common to one in which a few species are numerically dominant.
 B) simplifies until most of the plants originally present have disappeared.
 C) remains stable as long as major environmental factors (climate, human interference) remain constant.
 D) changes gradually because each species responds differently to the changing environment.
 E) changes until climax forest is established and a single species remains.
- 17) Which one of the following statements is *false*?
 A) Small-scale disturbances rarely have positive effects.
 B) Storms, fire, freezing, glacial advance and retreat, and volcanic eruptions are types of disturbances.
 C) Primary succession occurs when a community arises in a virtually lifeless area with no soil.
 D) Secondary succession occurs where a disturbance has destroyed an existing community but left the soil intact.
 E) The transition in species composition in a community is called ecological succession.
- 18) Which of the following statements concerning the role of fire in ecosystems is true?
 A) Forest fires did not occur in presettlement times. B) Fires decrease animal communities in ecosystems by destroying habitat.
 C) Forest fires are extremely destructive to ecosystems and should be put out as quickly as possible.
 D) Fire is essential to maintaining some ecosystems. E) Fire is not an important factor in developing and maintaining ecosystems.
- 19) In a hypothetical food chain consisting of grass, grasshoppers, sparrows, and hawks, the grasshoppers are
 A) primary consumers. B) primary producers. C) secondary consumers. D) secondary producers. E) detritivores.
- 20) A hypothetical community on a barren mid-Atlantic island consists of two fish-eating seabirds (the booby and the noddy), fungi and microorganisms that live on the birds' dung, a tick that feeds on these two birds, a cactus, a moth that feeds on cast-off feathers, a beetle that lives on dung organisms, and spiders that eat the other arthropods. There are no plants and no lichens. Which of the following choices *incorrectly pairs a member of this assemblage with its position in the trophic structure*?
 A) spiders, secondary consumer B) booby and noddy birds, primary consumers C) fungi, detritivores
 D) moths, detritivores E) the cactus is a producer
- 21) In a food chain consisting of phytoplankton → zooplankton → fish → fishermen, the fishermen are
 A) primary consumers. B) secondary consumers. C) tertiary consumers. D) primary producers. E) secondary producers.
- 22) In a certain ecosystem, field mice are preyed on by snakes and hawks. The entry of wild dogs into the system adds another predator of the mice. Of the following, the most likely short-term result of this addition is
 A) an increase in snake population. B) a tendency for hawks to prey on the dogs. C) extinction of the hawks.
 D) a reduction in numbers of mice. E) migration of the hawks to another ecosystem.
- 23) A hypothetical grassland community has the following five trophic levels: (1) grasses and other plants; (2) herbivores, such as aphids, rodents, and antelope; (3) carnivores, such as ladybugs and weasels, that feed mainly on herbivores; (4) carnivores, such as wolves and hawks, that feed on level (3) carnivores as well as on herbivores; and (5) detritivores, such as vultures, fungi, and bacteria. If a drought occurred, which of the consumer levels would most likely be affected first? (Assume that adequate drinking water remains available.)
 A) 2 B) 3 C) 4 D) 5 E) 3 and 4
- 24) All of the following processes occur in ecosystems *except that*
 A) energy flows through the system. B) carbon is cycled between biotic and abiotic forms.
 C) nitrogen is cycled between biotic and abiotic forms. D) producers convert light energy to chemical energy.
 E) the energy source that powers the system is used by consumers to make organic compounds.

- 25) A biology teacher takes fish, algae, pond weed, invertebrates, and bottom muck from a local pond and establishes them in an aquarium. When the system is stable, the teacher seals it into a large, airtight glass box and leaves the box in a sunny location. After 3 months, the organisms in the aquarium appear alive and healthy. Which of the following statements about the experiment is *false*?
- A) No energy has entered or left the glass box during the 3 months.
 B) Some of the energy in the system has moved from one organism to another during the 3 months.
 C) Some atoms from water molecules have become parts of organic molecules.
 D) The air in the glass box contains carbon dioxide.
 E) During the 3 months, the biomass of plant life was greater than the biomass of animal life.
- 26) For a given area and time period, the amount of solar energy converted to chemical energy is called
- A) primary succession. B) secondary succession. C) primary production. D) secondary production. E) primary photosynthesis.
- 27) If there are 1000 metric tons of producers in an ecosystem, about how much of the energy in those producers will be available to secondary consumers in this ecosystem?
- A) 100% B) 50% C) about 10% D) about 1% E) about 0.1%
- 28) Which of the following substances is *not* cycled between organic matter and abiotic reservoirs?
- A) water B) carbon C) nitrogen D) phosphorus
 E) All of the choices are cycled between biotic and abiotic reservoirs.
- 29) Which one of the following is *not* a component of the water cycle driven by solar energy?
- A) precipitation B) evaporation C) flow of water from land to sea D) transpiration
 E) All of these choices are components of the water cycle driven by solar heat.
- 30) Given that CO₂ is produced by respiration, why does the amount of CO₂ in the atmosphere remain relatively constant? (When answering this question, exclude the impact of human activities on atmospheric CO₂.)
- A) CO₂ is converted in photosynthesis to carbohydrates. B) CO₂ is split apart during photosynthesis.
 C) CO₂ mostly forms carbonate rocks. D) CO₂ is trapped in dead organisms' bodies. E) CO₂ is a buffer.
- 31) Carbon mainly cycles between the biotic and abiotic worlds by the processes of
- A) respiration and transpiration. B) transpiration and photosynthesis. C) evaporation and photosynthesis.
 D) respiration and photosynthesis. E) respiration and evaporation.
- 32) Which of the following is *not* true of the nitrogen cycle?
- A) It requires different types of bacteria. B) Nitrogen gas is converted to nitrates in plant leaves.
 C) Nitrogen is cycled through living organisms. D) When plants and animals die, their nitrogen is recycled.
 E) Nitrogen is a component of all proteins.
- 33) Which of the following is an ecological problem that can be caused by fertilizing a golf course with phosphorus-rich fertilizer?
- A) Too much phosphorus can kill the grass. B) Too much phosphorus will promote the growth of weeds.
 C) Phosphorus runoff can cause heavy growth of algae and cyanobacteria in lakes and rivers.
 D) Phosphorus can accumulate to toxic levels in animals in the vicinity, especially those higher on the food chain.
 E) Phosphorus is in short supply worldwide, and using it on golf courses is wasteful.
- 34) In experimental studies conducted at the Hubbard Brook Experimental Forest, it was found that
- A) water runoff stayed about the same in deforested areas. B) nitrogen loss was about double in deforested areas.
 C) most nutrients flowed into and then out of nondisturbed forests. D) acid precipitation caused a lack of calcium in the soil.
 E) None of the choices are correct.
- 35) Eutrophication of a lake could occur if
- A) phosphate-rich detergents were dumped into the lake. B) fertilizers from farms were washed into the lake.
 C) raw sewage was dumped into the lake. D) runoff from over-fertilized lawns reached the lake.
 E) All of the choices are correct.

II. Ecology Essays (30pts)

1. Interdependence in nature is illustrated by the transfer of energy through trophic levels. Figure 37.10 on page 753 depicts the transfer of energy in a food web of a terrestrial ecosystem.
- Choosing organisms from four different trophic levels of this food web as examples, explain how energy is obtained at each trophic level.
 - Describe the efficiency of energy transfer between trophic levels and discuss how the amount of energy available at each trophic level affects the structure of the ecosystem.
 - If the cells in the dead terrestrial plant material that washed into the lake contained a commercially produced toxin, what would be the likely effects of this toxin on this food web? Explain

2. Using an example for each, discuss the following ecological concepts. **(You will also need to refer to Chapter 36)**
 - a. Succession
 - b. Energy flow between trophic levels.
 - c. Limiting factors.
 - d. Carrying capacity.

AP Biology Summer 2009 Assignment

Ecosystem Story Book

Worth: 100pts

Purpose: The book that you are to write must be written for a 3rd grade reading level and must be in story form. This book is not meant to be a reference book, it should be a creative story. **This format will require you to fully understand the topics you are covering.** It will be nearly impossible to write a book at a third grade level without having a full understanding of the subject matter yourself. Also, be sure to remember that 3rd graders love pictures!

What the students will do: You are to choose one of the sixteen biomes found on our planet. Within the biome you have chosen, you must examine a particular ecosystem (Example - Biome: Tropical Rain Forest ... Ecosystem: El Yunque Rainforest, Puerto Rico). You must provide me with the Biome/Ecosystem you will be working on by **July 13th**. I expect that there will be no duplication within the class because there are quite a few different ecosystems within each individual biome. You must send me an email (sheikis.jenkins@pgcps.org) with your choice of biome and ecosystem. I will reply to you (via email) to confirm your message and approve your choice. **Do not** assume your choice is acceptable until you hear from me. There will be no **duplicates** within the class.

Sixteen Biomes Includes the Following:

Tropical Rain Forest	Desert	Savanna	Chaparral
Temperate Grassland	Coniferous Forest	Temperate Broadleaf Forest	Tundra
Lakes	Wetlands	Streams and Rivers	Estuaries
Intertidal Zones	Ocean Pelagic	Coral Reefs	
Marine Benthic Zone			

Directions: Within the context of your story, the following items must be included:

- A brief definition of the terms biome and ecosystem
- A geographic description of the biome/ecosystem chosen.
- Abiotic factors: definition and how they affect the ecosystem.
- Biotic factors: definition and how they affect the ecosystem.
- Limiting factors (density-dependent and density-independent): definitions and at least two specific examples of each type of limiting factor.
- Organisms found in this ecosystem: **a.** producers (4 minimum); **b.** consumers - primary, secondary, tertiary, etc. (6 minimum, 2 each).
- Description of a food web consisting of least fifteen different organisms (names of organisms must be included).
- Predator-prey relationships within the ecosystem (2 examples) – must explain relationship and indicate why the relationship is either beneficial or detrimental to the ecosystem.
- An energy (productivity) pyramid or biomass pyramid.
- A description of how the ecosystem has had (or could) rebuild after a natural disaster (secondary succession). Be sure to include the order in which new organisms would return to the ecosystem.
- The impact of human activity on this ecosystem, including a prediction of what may happen to this ecosystem in the future.
- In addition, the last page of your book must include a works cited page. This page must be compiled using MLA format and your references must include: **a.** minimum of five sources; **b.** one source must be a paper source other than your text book or an encyclopedia (scientific journal, scientific books).

Evaluation:

- The story must be in book format and must be handed in as a hard copy. An electronic copy will not be accepted.
- There is no minimum length for the story book. The only requirement is that all required topics are presented in the book.
- The book will be graded on its biological accuracy and on its creativity (see rubric). It will count as your first Special Project Grade.
- Remember the book must be written for a 3rd grade reading level.
- Please assess yourself using the rubric below and attach this rubric to your Ecology Story Book.
- Be prepared to present your work to your fellow classmates during the first week of school in our Gallery Walk.

AP Biology Summer 2008 Assignment

Ecosystem Story Book Rubric

Student Name _____ PD _____

Biome _____ Ecosystem _____

Part I: Self/Teacher Assessment of Ecology Story Book

Element	Points Possible	Self	Teacher	Comments
Format (30pts)				
Understood by age group	5			
Creativity	15			
Neatness/Grammar/well-edited	10			
Content (90pts)				
Definition of the terms biome and ecosystem	5			
Geographic description of the biome/ecosystem	5			
Definition of abiotic/biotic factors and their affect	10			
Limiting factors (density-dependent and density-independent): definitions and examples of each	10			
Producers	4			
Consumers - primary, secondary, tertiary, etc	6			
Food Web	10			
Predator-prey relationships	5			
Energy (productivity) or Biomass pyramid	5			
Secondary Succession	10			
Impact of Human Activity	10			
Reference Page	10			
Peer Review (30pts)				
1.	10			
2.	10			
3.	10			
Total	150			

Part II: Presentation of Ecology Story Book

During the first week of school you will present your story book to the class in the form of a Gallery Walk. Your fellow classmates will have the opportunity to learn from your work and evaluate it based on the standards. This evaluation will be calculated in your final grade.

Feedback: I value your thoughts, feeling, and insight to all aspects of this course and encourage you to respectfully share them throughout the year. Please provide feedback on the summer assignment below.

1. Outline/Concept Map _____
2. Reading Comprehension Sheets _____
3. Ecology Story Book _____
4. Overall Thoughts and Feelings: _____