

BOT/MBIO/ZOO 1005 – Concepts in Biology

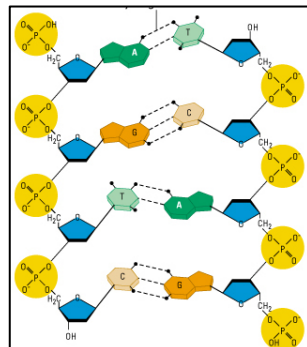
Final Exam (200 points) -- Form 1 (Pink)

May 8, 2007 – at 8:00 a.m.!!

Part I: Questions from the first part of the course

True-false (mark **A** for true, **B** for false):

1. If a geologist is trying to lower the pH of the water in a local well, it would make sense to inject an acid into the well, because acids lower pH by releasing H^+ into a solution.
2. Enzymes stop functioning correctly if they are denatured.
3. The diagram at right shows exactly four nucleotides.
4. Butter does not dissolve in water, because most covalent bonds in the butter are nonpolar C-C and C-H bonds.

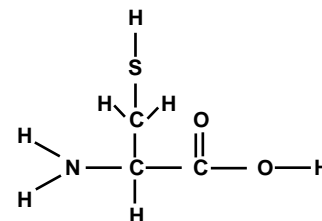


Multiple choice / matching

5. Which of the following occurs in some or all eukaryotic cells, but NEVER occurs in prokaryotic cells?
a. DNA b. protein c. cell wall d. ribosome e. nucleus
6. Which of the following is a function of a lipid?
a. cellulose makes up plant cell walls d. fat stores energy in plant and animal cells
b. starch stores fuel in plant cells e. enzyme speeds chemical reactions
c. chitin makes up insect exoskeletons
7. Sodium has an atomic number of 11. To fill its outermost shell, how many electrons must it give or take? (JP)
a. it must give away 2 d. it must take 1
b. it must give away 1 e. its outermost shell is already full
c. it must take 2
8. For lunch, I decided to have a high-carb diet; I'm having spaghetti with a couple of pieces of garlic bread (what does Atkins know anyways?). Which of the following is something we know about carbohydrates? (HT)
a. They do everything in the cells, like contraction in the muscles.
b. They make up the cell membrane.
c. They have lots of carbon-carbon bonds and no oxygen atoms.
d. They provide our cells with fuel.
e. They are an excellent source of protein in the diet.
9. Without mitochondria, your cells would die because they couldn't:
a. carry out photosynthesis
b. denature essential enzymes
c. change one isotope of carbon into another
d. make organic molecules out of inorganic starting materials
e. produce ATP
10. It was a hot day outside, and Jack decided to eat an ice-cream cone. As Jack ate the ice cream, he recognized that his body would use ___ to break down the molecules in his snack. (Inspired by a question from MJ).
a. starch b. DNA polymerase c. RNA polymerase d. digestive enzymes e. chloroplasts
11. What is the primary role of transport (channel) proteins within the cell membrane?
a. They prevent passage of water through the membrane.
b. They determine whether the cell is prokaryotic or eukaryotic.
c. They determine the size of the cell.
d. They generate the ATP the cell needs to fuel its chemical reactions.
e. They allow movement of salts and sugars through the membrane.

12. In water, the hydrogen bond forms between a hydrogen atom and:
- an oxygen atom in the same water molecule
 - an oxygen atom in a different molecule
 - a hydrogen atom in the same molecule
 - a hydrogen atom in a different molecule
13. Two isotopes of nitrogen that are sometimes useful in research are ^{14}N and ^{15}N . If the atomic number of N is 7, how are these two isotopes different from each other?
- ^{14}N has 7 protons and 7 neutrons, and ^{15}N has 8 protons and 7 neutrons
 - ^{14}N has 7 protons and 7 neutrons, and ^{15}N has 7 protons and 8 neutrons
 - ^{14}N has 14 electrons, and ^{15}N has 15 electrons
 - ^{14}N has 14 protons, and ^{15}N has 15 protons
 - ^{14}N has 14 neutrons, and ^{15}N has 15 neutrons

14. What type of molecule appears at right, and what is its function?
- It is glucose, and it is the fuel for respiration.
 - It is a nucleotide, and it is part of DNA.
 - It is an amino acid, and it forms part of a protein.
 - It is a steroid, and it acts as a hormone.
 - It is a phospholipid, and it forms part of the cell membrane.

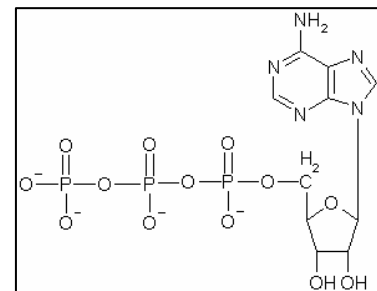


15. Whittaker proposed five kingdoms, which include all of the following EXCEPT: (ET)
- Animalia
 - Monera
 - Algae
 - Fungi
 - Plantae
16. All organic molecules contain _____. (DA)
- carbon and hydrogen
 - sodium and carbon
 - oxygen and iron
 - H_2O
 - sodium and oxygen

17. Which of the following statements is FALSE?
- Water is considered an organic molecule because it is abundant in all life forms.
 - One reason that water is considered essential for life is that it dissolves a wide variety of polar and weakly polar molecules.
 - Hydrogen bonds make it possible for plants to suck water out of soil.
 - Ice floats because when water freezes, the hydrogen bonds between water molecules stabilize in a “hole-y” pattern that is less dense than liquid water.

18. What is the name of the reaction that joins amino acids to each other? (FH)
- dehydration synthesis
 - hydrophilic synthesis
 - photosynthesis
 - respiration
 - hydrolysis

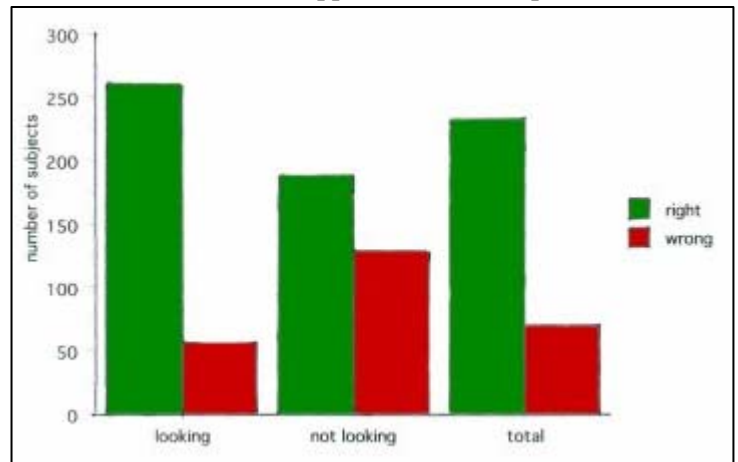
19. The molecule pictured at right is _____. Its function is ____, and its chemical structure is most closely related to ____.
- ATP ... to copy DNA ... a steroid
 - a steroid ... to act as a hormone ... a fat
 - a phospholipid ... to form the cell membrane ... a fat
 - ATP ... to power the cell's activities ... a nucleotide
 - an amino acid ... to make up a protein ... control what enters the cell



20. In what kind of bond do atoms share electrons EQUALLY? (MM)
- polar ionic
 - nonpolar ionic
 - polar covalent
 - nonpolar covalent
 - both a polar and a nonpolar ionic bond
21. Which of the following is a product of respiration? (DY)
- protein
 - mRNA
 - CO_2
 - glucose
 - O_2

22. A scientist called Rupert Sheldrake believes that people can sense the stare of an unseen person. He tests this hypothesis by having people work in pairs: one “looker” and one “subject.” In a series of 20 trials, the looker sits near a computer screen on which the instruction for each trial will be displayed. If the instruction says STARE NOW, the looker looks at the back of the subject's neck. If the instructions are DO NOT STARE, the looker looks away and thinks about something else. The subject sits with his or her back to the looker and wears a blindfold. The subject responds by saying “Looking” or “Not looking” within 5-10 seconds. If the subject’s response is correct, a recorder enters “Correct,” and if the response is incorrect the recorder enters “Incorrect.” In the experiment described above, what is the dependent variable?
- the number of trials
 - whether or not the “looker” is looking at the subject
 - the number of times the subject is correct
 - the fact that the subject is blindfolded
 - the command that appears on the computer screen

23. The data from many such experiments are compiled in the graph at right. What is a reasonable interpretation that Sheldrake might take from the data?
- The results support his hypothesis.
 - The results do not support his hypothesis.



24. Plants take in ___ from the atmosphere, and build ___ in the process of photosynthesis.
- H₂O ... ATP
 - CO₂ ... carbohydrates
 - N₂ gas ... amino acids
 - vitamins ... minerals
 - minerals ... ATP
25. Which of the following is physically the smallest?
- molecule
 - proton
 - atom
 - cell
 - nucleus (the organelle)

Part II: Questions from the second part of the course

True-false (mark **A** for true, **B** for false):

26. In DNA, A pairs with T, and C pairs with G.
 27. The anticodon is part of mRNA, and it binds directly to the ribosome.
 28. All viruses contain the element carbon.

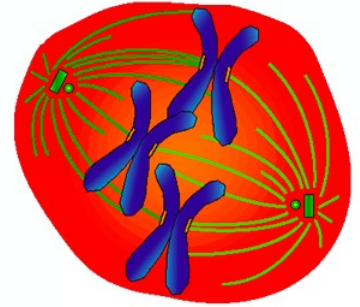
Multiple choice / matching

29. In the genetic code pictured at right, the codon AAA corresponds to Lys, which means “put the ___ called lysine here.”
- amino acid
 - mRNA
 - codon
 - tRNA
 - gene
30. What **protein** would be synthesized from the DNA sequence CAA TAT AGT AGC?
- GUU AUA UCA UCG
 - GTT ATA TCA TCG
 - CUU UAU ACU AGC
 - val – ile – ser – ser
 - leu – tyr – thr – ser

		Second Base								
		U		C		A		G		
First Base	U	UUU	phe	UCU	ser	UAU	tyr	UGU	cys	U
		UUC	phe	UCC	ser	UAC	tyr	UAC	cys	C
		UUA	leu	UCA	ser	UAA	STOP	UGA	STOP	A
		UUG	leu	UCG	ser	UAG	STOP	UGG	trp	G
	C	CUU	leu	CCU	pro	CAU	his	CGU	arg	U
		CUC	leu	CCC	pro	CAC	his	CGC	arg	C
		CUA	leu	CCA	pro	CAA	gin	CGA	arg	A
		CUG	leu	CCG	pro	CAG	gin	CGC	arg	G
	A	AUU	ile	ACU	thr	AAU	asn	AGU	ser	U
		AUC	ile	ACC	thr	AAC	asn	AGC	ser	C
		AUA	ile	ACA	thr	AAA	lys	AGA	arg	A
		AUG	met	ACG	thr	AAG	lys	AGG	arg	G
G	GUU	val	GCU	ala	GAU	asp	GGU	gly	U	
	GUC	val	GCC	ala	GAC	asp	GGC	gly	C	
	GUA	val	GCA	ala	GAA	glu	GGA	gly	A	
	GUG	val	GCG	ala	GAG	glu	GGG	gly	G	

31. During the entire process of protein synthesis (including transcription and translation), which of the following molecules physically touches DNA?
- tRNA
 - the ribosome
 - RNA polymerase
 - DNA polymerase
 - all of them
32. Which of the following does NOT add to genetic variability within a species? (DY)
- sexual reproduction
 - binary fission
 - crossing over
 - mutation
 - meiosis
33. Which of the following is physically the largest? (based on a question from JP)
- codon
 - gene
 - chromosome
 - cell
 - nucleotide
34. Binary fission is different than meiosis in that binary fission ____: (DA)
- does not create an exact copy and occurs in prokaryotes
 - creates an exact copy and occurs in prokaryotes
 - creates an exact copy and occurs in eukaryotes
 - does not create an exact copy and occurs in eukaryotes
35. Larissa and Nicole sent me a wikipedia article about a breed of short-legged “munchkin” cats. According to the article, “Kittens bearing two copies of the munchkin gene (MM) will not survive. Kittens bearing one munchkin gene and one normal gene (Mm) will be munchkins. Kittens bearing two normal genes (mm) will be normal.” Which of the following crosses could produce kittens with the MM genotype?
- Mm x mm
 - Mm x Mm
 - mm x mm
 - any of them
 - only a and b
36. In hedgehogs, albino coloration is associated with the genotype AA. Ivory color is conferred by the genotype aa. If a heterozygous albino hedgehog is bred with an ivory hedgehog, what percentage of offspring SHOULD be ivory? (LC)
- 0%
 - 25%
 - 50%
 - 75%
 - 100%
37. In animals, haploid ____ combine to form a diploid ____, which then divides by ____.
- gametes ... zygote ... mitosis
 - zygote ... gamete ... binary fission
 - gametes ... chromosome ... meiosis
 - sex chromosomes ... zygote ... mitosis
 - sperm cells ... egg cell ... meiosis
38. A man gets into an accident and has to have a blood transfusion if he is to live. His blood type is AB. The nurse is asked to go get the blood but when she gets there she can't figure out which one to get. Which one could save his life? (question by BA)
- type A
 - type B
 - type O
 - type AB
 - any would work
39. In lecture, I showed you a video of asexually reproducing sea anemones. In these animals:
- the offspring are genetically identical to their parents (except for mutations).
 - the offspring are genetically more alike than they would be if their parents reproduced sexually.
 - asexual reproduction may be an adaptation to a stable (unchanging) environment.
 - mitosis, but not meiosis, is part of the reproductive cycle.
 - all of the above are true.
40. Two sister chromatids begin to move toward opposite poles during ____ of mitosis. (RB)
- prophase
 - metaphase
 - anaphase
 - telophase
 - none of the above

41. Which of the following statements about the cell pictured at right is FALSE?
- The function of the DNA in the cell is to specify the amino acid sequence of the cell's proteins.
 - The cell could be a eukaryotic cell but not a prokaryotic cell.
 - The cell is about to divide, and the DNA has already been replicated.
 - All three chromosomes pictured in the cell are identical to each other.
 - The curved lines extending from each chromosome to the poles of the cell are part of the spindle.



42. Which of the following statements is FALSE?
- Your skin cells and liver cells have different functions because different combinations of genes are turned on and off in the two cell types.
 - If the recessive allele that causes hemophilia is on the X chromosome, a male with hemophilia will pass the disorder to all of his sons but none of his daughters.
 - Nondisjunction during meiosis produces gametes with incorrect numbers of chromosomes, and the resulting child may have a chromosomal disorder such as Down syndrome.
 - If a person must inherit a "primordial dwarfism" allele from both parents to be a dwarf, the dwarfism allele must be recessive.
43. During _____, homologous chromosomes exchange segments so that gametes contain new allele combinations. This is called _____. (SC)
- prophase I ... crossing over
 - prophase II ... random fertilization
 - metaphase I ... random fertilization
 - prophase II ... crossing over
 - mitosis ... binary fission
44. Breast cancer:
- is a problem of "too much mitosis" by certain abnormal cells
 - can spread to other parts of the body in a process called metastasis
 - can result from mutations in genes encoding cell cycle control proteins
 - only b and c are correct
 - a, b, and c are correct
45. How many chromosomes does an organism's diploid cell have, if the organism has 4 chromosomes in one haploid cell? (MG)
- 2
 - 6
 - 8
 - 10
 - 16
46. I have a close friend who has cystic fibrosis. What is the most likely explanation of what happened? (HT)
- Cystic fibrosis is a sickle-cell disease so there was a base substitution in her DNA sequence.
 - Because of an insertion or deletion of more than one base, a codon "reading frame" shifted, and an essential protein's shape was ruined.
 - Nothing major happened with her DNA sequence, if anything, bases were deleted or inserted in a multiple of three, and the amino acid sequence wasn't changed.
 - Radiation exposure to skin cells caused DNA mutations that migrated to the lungs and caused the disease.
47. Honeybees are dying across the U.S., and some suspect the culprit is a virus. If it is a virus, scientists should be looking for:
- a parasite that is not composed of cells
 - a parasite that does not have any genetic material
 - a parasite that does not have any protein
 - a parasite composed of prokaryotic cells
 - a parasite that has a cell membrane
48. In the nucleus, RNA polymerase makes _____, which then leaves the nucleus and is translated at a structure called a _____. (Inspired by a question by AH).
- messenger RNA ... ribosome
 - tRNA ... mitochondrion
 - DNA polymerase ... chromosome
 - an amino acid ... phospholipid bilayer
 - DNA ... chromatid

49. South Korean researchers have created the first-ever dog clone, a male Afghan hound. How could the researchers have done this?
- They could have used a sperm cell from a male dog to fertilize the egg of a female dog.
 - They could have fused two sperm cells taken from male dogs, then taken out one of the Y chromosomes.
 - They could have fused two egg cells from two different female dogs, then added a Y chromosome.
 - They could have taken the nucleus out of a female dog's egg cell and replaced it with a nucleus from the male dog they were cloning.
 - All of the above approaches could have worked.
50. Where in the human body does meiosis occur?
- Anywhere you want it to.
 - In your gametes.
 - In your ovaries and testes.
 - In any diploid cell of the body.
 - In your skin cells.

Part III: Questions from the third part of the course

True-false (mark **A** for true, **B** for false):

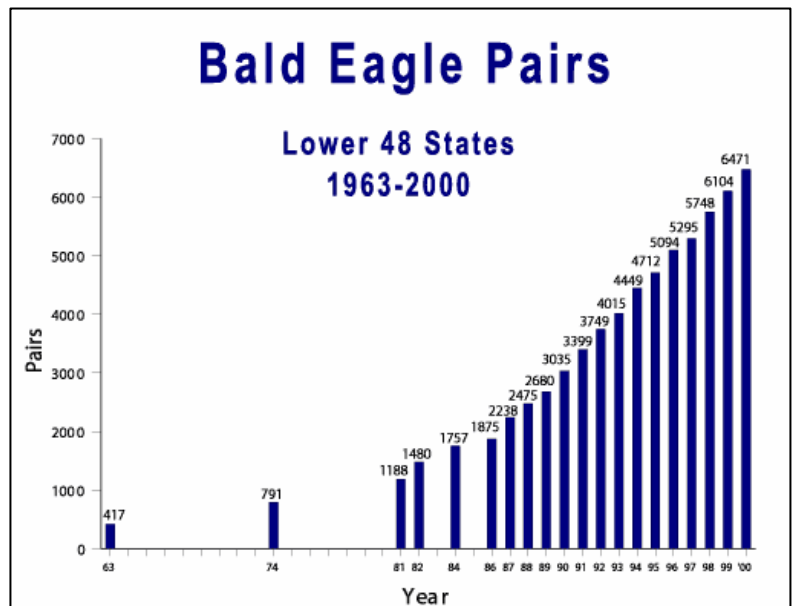
51. Endosymbiosis theory explains the origin of the digestive tract in animals with a gastrula.
52. There are more species of invertebrates than of vertebrates. (Inspired by a question by AH)
53. Tetrapods include birds, mammals, reptiles, and amphibians. (CT)

Multiple choice / matching

54. Which of the following best describes natural selection?
- in each generation, individuals well adapted to their environment are more likely to live longer and therefore tend to produce more offspring than the less well adapted individuals
 - the death of individuals occur completely at random with respect to their genotypes
 - the death of individuals occur completely at random with respect to their phenotypes
 - the survival and reproductive success of individuals depend to a limited extent upon their genetic adaptations to their environment
 - most deaths occur soon after fertilization, as a result of hereditary deficiencies
55. Arthropods (such as crabs) and fungi (like mushrooms) are similar in that: (HR and MK)
- they both contain chitin
 - some of them are edible
 - they belong to the same kingdom
 - they both have external digestion
 - both a and b are true
56. Which of the following adaptations occur in angiosperms? (based on a question by ET)
- | | |
|--------------|---------------------|
| i. cuticle | iv. vascular tissue |
| ii. fruit | v. stomata |
| iii. flowers | vi. lignin |
- ii and iii only
 - iii and iv only
 - i, ii, iii, iv, v, and vi
 - i, iv, and vi only
 - i, ii, iii, iv, and v only
57. There is evidence that green algae are the predecessor for land plants. What is some of the evidence? (NK)
- Both algae and plants have cell walls made of cellulose.
 - The lignin from plants is found in their xylem and is also present in algae.
 - An alga has modified stomata that help it shut out unwanted water, preventing it from being waterlogged.
 - Algae and plants have chloroplasts with the same photosynthetic pigments.
 - Both a and d are correct.

58. Kingdom Protista groups together very diverse eukaryotes. One group of these includes *Giardia*, which is a one-celled heterotroph that may cause diarrhea and cramps. What group does this organism belong to? (AC)
- a. singled-celled algae b. protozoans c. multicellular algae d. slime molds e. bacteria
59. When biologists wonder whether a particular mutation affects an organism's fitness, they are really asking about the effect on the organism's:
- a. physical strength d. DNA replication rate
b. average cell size e. reproductive success
c. coelom development
60. The fact that mitochondria have their own DNA and ribosomes provides evidence of:
- a. the endosymbiosis theory of the origin of eukaryotic cells
b. the Miller hypothesis for the origin of life
c. the multicellular theory for the origin of animal life
d. the theory that fungi and plants move onto land together
e. none of the above is correct

61. If you look at the graph to the right, you'll notice that the number of bald eagles in the lower 48 states declined to near extinction before the eagles were added to the endangered species list and the population began its recovery in the 1980s. A person who studies the evolution of this species might be concerned about the loss of genetic diversity that resulted from:
- a. the bottleneck effect
b. immigration into the population
c. a reduced mutation rate
d. excessive birth rates
e. exponential growth



62. A _____ is a type of _____, and it can produce asexually and sexually. (LD)
- a. blastula ... fungus
b. mushroom ... fungus
c. crayfish ... gymnosperm
d. gastrula ... zygote
e. mushroom ... plant

63. Put the following in order of evolution, with '1' representing earliest to evolve, and '4' representing the most recently evolved. (LC)

Gymnosperms; Ferns; Angiosperms; Mosses

- a. 3 2 1 4 b. 2 3 4 1 c. 3 2 4 1 d. 4 3 2 1 e. 1 2 3 4
64. The antibacterial chemical called triclosan was once used mostly in hospitals, but it is now found in soaps, deodorants, toothpastes, mouthwashes, cleaning supplies, kitchen utensils, toys, bedding, socks, and trash bags. Which of the following statements about this scenario is true?
- a. natural selection will increase the incidence of triclosan resistance by acting on variation already present in the population of bacteria
b. sexual reproduction among the bacteria will decrease the genetic variability in the population
c. exposure to triclosan causes bacteria to change and become resistant
d. the bacteria will evolve the adaptations they need to survive exposure to the triclosan
e. all of the above statements are true

65. A new marine species has just been discovered by the world famous scientist, Dr. Rachel Price. In a report to the press, she stated that the new species is radially symmetrical, non-segmented, and exhibits embryonic development that is very similar to that of chordates. This new species is most likely a(n): (RP)
- a. arthropod b. annelid c. echinoderm d. sponge e. cnidarian
66. The OU Daily's headline says, "Mysterious killer of America's honeybees threatens many crops" and goes on to explain that "About one third of the human diet comes from insect-pollinated plants." Bees are animals, and they make honey, but why should their decline threaten crops?
- a. Because pollinators eat the animals that eat our crops.
 b. Because pollination is required for plants to reproduce sexually.
 c. Because pollinators help plants disperse their seeds, so they improve the plants' reproductive success.
 d. a, b, and c are correct.
 e. only b and c are correct.
67. Which of the following statements is FALSE?
- a. A pollen grain delivers sperm cells to the egg in the female part of a flower.
 b. A seed is a reproductive structure that contains pollen.
 c. Plants that produce swimming sperm are generally restricted to moist habitats.
 d. A bell pepper, a zucchini, and a tomato are all fruits because they all contain seeds.
 e. A zygote can occur in the female flower part, but not the male flower part.
68. Which of the following lists contains ONLY prezygotic barriers? (DA)
- a. habitat isolation, gametic isolation, and punctuated equilibrium
 b. hybrid offspring die, mechanical isolation, and habitat isolation
 c. behavioral isolation, punctuated equilibrium, and temporal isolation
 d. habitat isolation, temporal isolation, and behavioral isolation
69. Which of the following does NOT correctly match the name of a reproductive barrier with an example of the reproductive barrier? (compiled from questions by AO, CM, and HT)
- a. Behavioral isolation – birds of the Amazon attract their mates with certain rituals, and some species of birds have unique features in their rituals that other species are not familiar with.
 b. Gametic isolation – a penguin and a whale cannot physically mate because of the shapes of their reproductive organs.
 c. Hybrid sterility – a horse and a donkey mate and create a mule, which cannot undergo meiosis.
 d. Habitat isolation – a polar bear and a grizzly bear cannot mate due to their different locations on the continent.
 e. Behavioral isolation – one species of firefly uses two flashes to attract mates, while another species uses three flashes.

70. The fossil pictured at right is a trilobite found in Oklahoma. It died some 400 million years ago, a time when Oklahoma was covered in shallow seas. Suppose that researchers used the radioactive isotope uranium-235 to estimate the age of this fossil at 400 million years. The half-life of ^{235}U is about 700 million years. About how much of the original amount of ^{235}U would remain in the fossil today?



- a. 100% d. more than 0%, but less than 25%
 b. more than 50%, but less than 100% e. 0%
 c. more than 25%, but less than 50%
71. I was at the Dubuque, Iowa, farmers' market on Saturday morning and talked to a lady who worked for a company that grows plants for landscaping. She had a plant she called "Scotch moss" that I had never seen before, so I asked her if it was a moss or a flowering plant. She said, "Oh, it's a real moss, but it produces flowers." Could her answer be correct?
- a. Yes, because some mosses (and ferns) do produce flowers.
 b. No, because mosses only produce pollen in cones, never flowers.
 c. No, because mosses produce swimming sperm, never pollen in flowers.

72. Which of the following events occurred MOST recently? (JP)
- a. O₂ accumulating in the atmosphere
 - b. Prokaryotic fossils
 - c. Eukaryotic fossils
 - d. Plants/fungi colonize land
 - e. They all happened at the same time
73. Insects and crustaceans are:
- a. arthropods
 - b. annelids
 - c. echinoderms
 - d. nematodes
 - e. b and d
74. I grew up near the place in California where the giant redwoods grow. Redwood trees are conifers, so it is reasonable to predict that these trees:
- a. produce pollen
 - b. produce flowers
 - c. have vascular tissue strengthened with lignin
 - d. a and c only
 - e. a, b, and c
75. Which of the following statements is FALSE?
- a. The three groups of mammals are monotremes, marsupials, and placental mammals.
 - b. The coelom occurs in echinoderms, arthropods and chordates, among other phyla of animals.
 - c. All phyla of animals contain at least some aquatic representatives.
 - d. A leech is a segmented animal that is closely related to earthworms, so it is an annelid.
 - e. Birds are more closely related to mammals than they are to reptiles.

Part IV: Questions from the fourth part of the course

True-false (mark **A** for true, **B** for false):

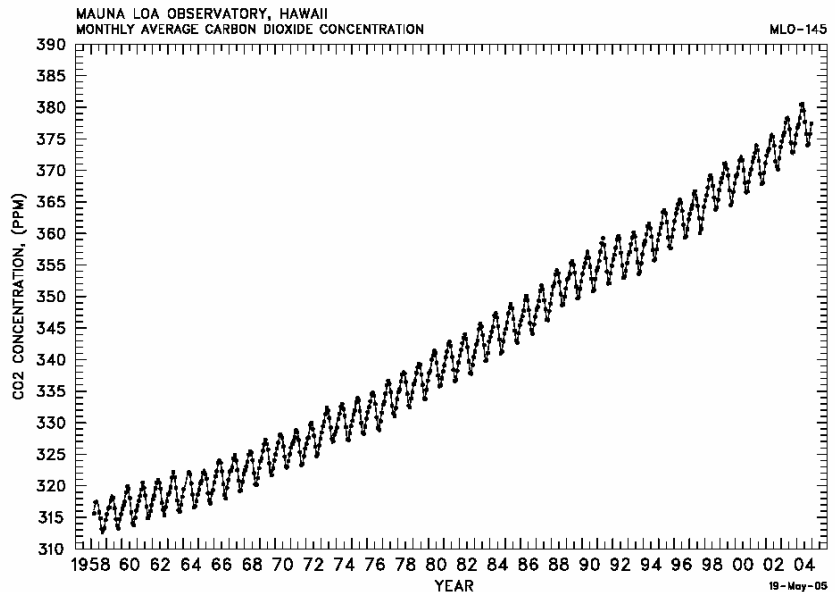
76. According to ice core data, over the past 400,000 years or so, periods of high CO₂ concentration have coincided with periods of high average surface temperature.
77. All biomes worldwide have the same average rainfall and temperature.
78. Plants get carbon from soil and water, whereas fungi and animals get carbon by eating other organisms.

Multiple choice / matching:

79. When researchers collected fish from a certain lake in Texas, they found that top predators consistently had higher concentrations of mercury than herbivorous fish. It is likely that the mercury:
- a. is most concentrated in the fatty tissues of the predatory fish
 - b. is most concentrated in the urine of the predatory fish
 - c. is equally concentrated in the fatty tissues and the urine of the predatory fish
80. Coral animals have autotrophic protists living in their tissues. During the day, the coral animals get their food from the photosynthesizing protists, which benefit by having a safe place to live. What is the name for the relationship between the coral animals and their live-in food supply?
- a. competition
 - b. mimicry
 - c. mutualism
 - d. decomposition
 - e. auto-heterotrophy
81. A researcher is curious about genetic variation within a population of fruit flies. To study this question, the researcher should check the DNA sequence of:
- a. members of the same species
 - b. members of different species that live in the same area
 - c. members of different species that live on different continents
82. Which of these would be an example of a density-independent limit to the growth of a population?
- a. disease that spreads by close contact between individuals
 - b. competition for nutrients
 - c. a limited supply of breeding sites
 - d. an extended period of drought
 - e. predation

83. I grew up in a part of California where the winters were mild and rainy, and the summers were hot and dry. When we would go hiking, we'd see tough, fire-adapted shrubs, and we would often see seed-eating rodents and foliage-eating deer. What type of biome was I in?
- a. savanna b. desert c. prairie d. chaparral e. tundra

84. The graph at right shows the concentration of CO₂ in the atmosphere since 1958. According to ice core data, the concentration of CO₂ in the atmosphere during this period is _____ it has been over the past 400,000 years.



- a. higher than
b. lower than
c. about the same as

85. What is the current scientific consensus about the consequence of increasing CO₂ concentrations in Earth's atmosphere?
- a. It will cause a new ice age.
b. It will reduce the amount of sunlight striking Earth's surface.
c. It will not cause any problems because plants will increase their photosynthetic rate.
d. It will take up so much space that it will reduce the concentration of O₂ in the atmosphere.
e. It will cause the average temperature of Earth's surface to increase.

Match these ecological interactions with the correct level:

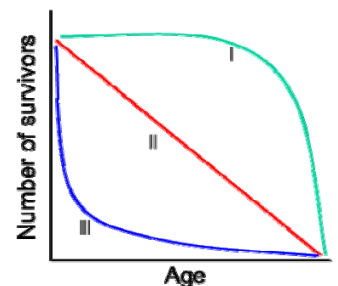
- a. population b. community c. ecosystem
86. Mother cat nursing her kittens
87. Honeybees pollinate a cherry tree
88. Nutrients from fertilizer enter a pond and cause an algae "bloom"
89. Multiple species of bacteria live in my intestines and on my skin

Questions 90 to 92 relate to the following information: Salmon eggs hatch in freshwater streams, and the juvenile salmon migrate to the ocean during the first year of their lives. They feed and grow for up to five years in the ocean, where they accumulate fat-soluble PCBs from human contamination of the oceans. At maturity, they begin the long journey back to their home streams, where they spawn. At the spawning grounds, females lay up to 8000 eggs. The male fertilizes the eggs, and both adults die soon thereafter. The PCBs then enter the aquatic and terrestrial food webs.

90. If PCBs are incorporated into the freshwater vegetation, where would you expect to find the greatest concentrations of these toxins?
- a. in snails that eat the freshwater vegetation. d. in bears that eat the large fish
b. in small fish that eat the snails e. they would be equal in all trophic levels
c. in large fish that eat the small fish

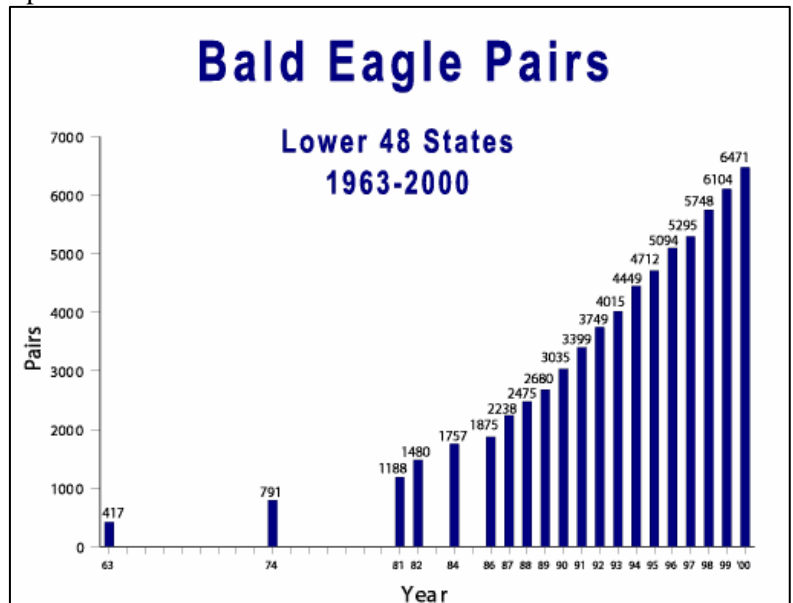
91. If the PCBs become more concentrated in successive trophic levels, that's called:
- a. habitat destruction d. synfluvial accumulation
b. biomagnification e. detritivory
c. ultraconcentration

92. In the graph at right, which curve most likely represents the life history of the salmon?
- a. I b. II c. III



93. Which biome would include zebras and fire-adapted trees? (AC)
 a. chaparral b. temperate grasslands c. coniferous forests d. savanna e. tundra
94. A heron eats a frog. If the frog is a primary consumer, it could eat:
 a. algae b. herons c. flies d. other frogs e. sunshine
95. Why are most energy pyramids limited to three to five levels?
 a. Energy pyramids do not accurately represent the energy dynamics of a food web, in which there often are more than five trophic levels.
 b. The higher the trophic level, the larger the organism; the larger the organism, the less likely it will be prey.
 c. Nutritional quality decreases with increasing trophic level.
 d. Most ecosystems have insufficient space to support the increased number of organisms that more trophic levels would require.
 e. There is insufficient energy to support more trophic levels.

96. The graph at right shows the number of bald eagles in the lower 48 states over nearly 40 years. The recovery of this once-endangered species coincides with the period during which the insecticide DDT was banned in the U.S. What was the effect of DDT on the eagles?



- a. it poisoned adult birds
 b. it made the birds more likely to fly into populated areas, where they were shot and killed
 c. it poisoned the baby birds
 d. it poisoned the animals that the adults feed the baby birds
 e. it weakened the eagles' egg shells, reducing their reproductive success

97. Which of the biomes has greater biodiversity than any other biome?
 a. tundra d. desert
 b. temperate deciduous forest e. temperate grassland
 c. tropical rainforest
98. Species richness is a measure of:
 a. biodiversity d. logistic growth
 b. population dispersion e. exponential growth
 c. population density
99. As I'm writing this question, I'm watching finches and chickadees eating sunflower seeds out of my bird feeder. (I even watched a squirrel make a desperate, amusing and ultimately unsuccessful bid for some seeds). Based on this information, what trophic level are the finches and chickadees occupying?
 a. producer b. autotroph c. decomposer d. secondary consumer e. primary consumer
100. There is no question 100 because your clicker only goes up to 99! This is good for 2 free points.

😊😊 **Congratulations on surviving non-majors biology!! Enjoy your well-deserved break.** 😊😊