

## BIOLOGY 11 - REVIEW FOR EXAM 3

Along with all your Blue Book Questions (BBQ's), Reading Assignments and Lab Activities, you should also be able to answer all of the following questions for the next exam. This review sheet is provided to help you learn how to organize your studying for the class, **it is not meant to be an exhaustive list of all possible questions** on the test. I highly recommend using the activities and practice quizzes in your textbook as well as the videos and other resources on my webpage: <http://zanniedallarasciencepage.weebly.com/>

**Topics:** DNA Structure, DNA Replication, Mendelian Genetics, DNA>RNA>Protein, Evolution, Ecology, Ecosystems

**Chapters:** 8, 9, 11, 19, 20 & 21

**Blue Book Questions:** Address 4 Misconception, BBQ15-22 & Activity#5-6

### Lecture #14: DNA Structure & Replication

**STUDENT LEARNING OUTCOME: (3) DNA AND HEREDITY:** The students will be able to 1) understand the significance of DNA as the basis for heredity, structure, function and disease in living organisms: 2) describe the DNA molecule and explain how it is used in living systems to create proteins: and 3) describe how proteins function in living cells.

#### Big Idea:

1. Why does DNA need to make EXACT copies of itself?
2. How does DNA allow traits to be inherited?
3. Define the following: nucleic acid, nucleotide, base, DNA, RNA
4. What are the three components of a nucleotide?
5. How are nucleotides linked together to form nucleic acids? (What kind of bonds?)
6. What are the 3 major differences between DNA and RNA?
7. Differentiate between Replication, Transcription and Translation.
8. Role of different enzymes: helicase, primase ligase and polymerase (1 & 3).
9. Why is DNA called a double helix? And what is the benefit of keeping DNA in this form? 8) What is a "sugar-phosphate backbone"?
10. What is 5'→3' mean?
11. What type of bond holds the two strands of DNA together?
12. What are the DNA base pairing rules?

### Example Questions:

<p>1. Nucleotides are linked together in a chain:</p> <ol style="list-style-type: none"> <li>a. sugar to base</li> <li>b. sugar to sugar</li> <li>c. phosphate to base</li> <li>d. sugar to phosphate</li> </ol>	<p>If a sequence of DNA is: AATTTTCGGG Its complimentary DNA strand would be:</p> <ol style="list-style-type: none"> <li>a. AATTTTCGGG</li> <li>b. TTAAAGCCC</li> <li>c. UUAAAGCCC</li> <li>d. TTUUUGCCC</li> </ol>
<p>Both DNA and RNA</p> <ol style="list-style-type: none"> <li>a. are single-stranded molecules</li> <li>b. contain the same four nucleotide bases</li> <li>c. are polymers of amino acids</li> <li>d. are made of sugar, phosphate, and a base</li> </ol>	<p>The role of DNA Helicase is to:</p> <ol style="list-style-type: none"> <li>a) Unwind DNA at the H-Bonds</li> <li>b) Unwind DNA at the Covalent-Bonds</li> <li>c) Add new nucleotides in DNA Replication</li> <li>d) Add new nucleotides in Translation</li> </ol>

**Lecture #15: Genetics**

1. Who was Mendel and what did he study?
2. What is the difference between character and trait?
3. What is the difference between P, f1 and f2 generations?
4. **REVIEW the Homework on genetics for practice.**

Be able to answer all the questions in the genetics chapter of your lab manual.

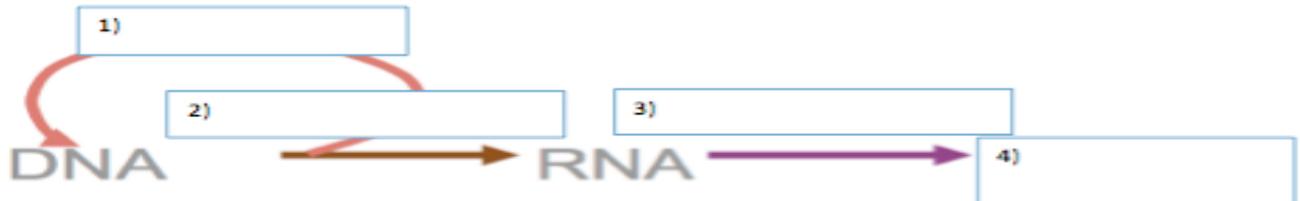
Be able to do:	Vocab
<ul style="list-style-type: none"> <li>• Monohybrid and dihybrid crosses                             <ul style="list-style-type: none"> <li>○ Be able to predict the probability of getting particular offspring.</li> </ul> </li> <li>• Sex linked crosses</li> <li>• Genotypic and phenotypic ratios</li> </ul>	<ul style="list-style-type: none"> <li>• What is a                             <ul style="list-style-type: none"> <li>○ Karyotype?</li> <li>○ Allele?</li> <li>○ Loci?</li> <li>○ Dominant allele?</li> <li>○ Recessive allele</li> <li>○ Homozygous, heterozygous genotype?</li> <li>○ Genotype and phenotype? And their ratios.</li> <li>○ Carrier?</li> <li>○ Incomplete and co dominance?</li> </ul> </li> </ul>

**Lecture #16: DNA→RNA→Protein**

**Big Idea:**

- 1.
2. Complete the central dogma of biology below:

Fill in the Blanks:



3. Original Piece of DNA:

**ACGATACCCTGACGAG**

4. Run Replication (Complementary DNA):
5. Run Transcription (Create complementary RNA strand from the original DNA)
6. Run Translation (Create the protein)

\*Be able to run the steps above given only the key words replication, transcription and translation.

7. What makes a mutation good, bad or neutral?
8. What is a frame shift mutation?

**Lecture #16, 17, & 18: How Population's Change, How Population's Change, & Speciation**

**STUDENT LEARNING OUTCOME: (5) DIVERSITY OF ORGANISMS:** The students will be able to compare and contrast characteristics of various organisms particularly related to energy sources (feeding style), cellular composition, reproduction and relationship to the ecosystem. **(6) ECOLOGY AND THE ENVIRONMENT:** The students will be able to 1) describe the flow of energy through the ecosystem, then construct a food web, placing specific species of organisms at each level; 2) choose a common ecosystem disturbance of human origin and predict the effects of that disturbance on a food web; and 3) understand the complexity of ecosystems and environmental issues.

**Big Idea:**

1. Populations change over time. What factors lead to evolution?
  2. What does survival of the fittest mean?
  3. What is a boom and bust population cycle?
4. Define Evolution
  5. How do you calculate population growth rates? (what 2 things contribute to making a population larger and what 2 things contribute to making it smaller?)
  6. Compare and contrast density dependent and density independent limiting factors. Give examples of each.
  7. Be able to draw, identify and explain the 3 (I, II, III) types of survivorship curves.
    - a. Regarding the survivorship curves, be able to explain the trade off between care and high numbers of offspring with limited resources. (R and K strategists)
  8. What is an invasive species?
  9. Why are invasive species detrimental to the environment?
    - a. Why can't native species like the western pond turtle handle the addition of red eared slider turtles and bullfrogs?
    - b. Given the life history/survivorship curve of turtles, why are these threats so harmful?
    - c. Why would an organization meant to protect the oceans, promote eating lionfish?
    - d. How has Australia gone about managing invasive rabbits? Has it been successful? Why do they care, bunnies are cute after all?
  10. Explain the circumstances that cause, and be able to draw: exponential growth, logistic growth and carrying capacity.
  11. What 2 factors determine the size of a population's carrying capacity?
  12. What do the lynx and the hare show about population cycling?
  13. What is meant by population density? How is population density shown? Measured?
  14. What impact does high population density have on a populations health?
    - a. What are density dependent and density independent factors that affect population growth?
  15. What is meant by population age structure? How is it shown? Measured? Why do scientists care about it?
  16. Population growth models need what 4 pieces of information?
  17. What is a limiting factor and how is it tied to carrying capacity?
  18. How are Boom – Bust population dynamics shown throughout evolution? Think mass extinction.

**Lecture #19 & 20: Population Ecology & Community Ecology****Big Idea:**

1. What happens if humans decrease biodiversity in a habitat?
  2. How do human affect biodiversity?
3. What are the key differences between an R and K strategist?
  4. What three factors do population ecologists study?
  5. What two graphs explain different types of growth rate? Which is more realistic?
  6. What is carrying capacity and why does it vary from species to species?
  7. Biodiversity – What is it? Why is it important and what three factors are involved?
- All Material Below has been moved to Exam4**
8. ~~What 4 factors have caused a decrease in biodiversity and which among them is the worst?~~

9. ~~What is a keystone species? Explain the role of the otter in their ecosystem and what would happen without them?~~
10. ~~There are three types of interspecific interactions, what are they and be able to give an example of each.~~
11. ~~Which one results in the competitive exclusion principle? What is this?~~
12. ~~What are three things that prey have evolved to avoid predation? Why do prey seem to evolve faster than predators?~~

### **Moved to Exam4 Lecture #21: Ecology – Ecosystems:**

#### **Big Idea:**

1. ~~What is a niche and how is it different than a biome?~~
2. ~~What does a species need to survive?~~
3. ~~What is ecological succession? Why are roots so important to primary succession?~~
4. ~~Explain resource partitioning—what causes it?~~
5. ~~Tropic structure is related to the 2 laws of energy—how?~~
6. ~~Why is a food web better at describing relationships than a food chain?~~
7. ~~What is the role of a Producer? Consumer? Primary Consumer Vs secondary Consumer? Top predator?—which are there more of and why?~~
8. ~~What is the 10% rule?~~
9. ~~What is a biome?~~
10. ~~Why is light so important in a marine Biome?~~
11. ~~What is the importance of a wetland biome?~~
12. ~~Eutrophication is a process that causes what? (tell the story)~~
13. ~~How does biomagnification of mercury work?~~
14. ~~Explain the phosphorus cycle?~~