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| **REVIEW FOR STATE TEST AND FINAL EXAM BIOLOGY 2015**  **NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_SCI#\_\_\_\_\_\_\_\_\_** |
| **What are universal laws in science?** |
| **How do ethics apply to science?** |
| **Why should someone who is not planning to become a scientist study science?** |
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| **How do scientific investigations begin?** |
| **What are two types of experiments that scientists can use to test hypotheses?** |
| **What is the difference between a theory and a hypothesis?** |
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| **Why do scientists use SI units for measurement?** |
| **What are some tools and techniques that scientists use in the laboratory?** |
| **What can you do to stay safe during an investigation?** |
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| **What are some of the branches of biology?** |
| **What are seven characteristics that all living things share?** |
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| **What is one way that genetic engineering affects our lives?** |
| **How has biotechnology provided new tools for scientists to understand biological processes?** |
| **How are biological factors used to verify an individual’s identity and to ensure public safety?** |
| **What ethical issues are raised by the use of biotechnology?** |
| **How does biological research help protect the environment?** |
| **How do new technologies help us study the environment?** |
| **How do biologists rely on the contributions of community members to develop solutions for environmental problems?** |
| **What makes up matter?** |
| **Why do atoms form bonds?** |
| **What are some important interactions between substances in living things?** |
| **What makes water a unique substance?** |
| **How does the presence of substances dissolved in water affect the properties of water?** |
| **What are chemicals of life made from?** |
| **What is the role of carbohydrates in cells?** |
| **What do lipids do?** |
| **What determines the functions of proteins?** |
| **What do nucleic acids do?** |
| **Where do living things get energy?** |
| **How do chemical reactions occur?** |
| **Why are enzymes important to living things?** |
| **How were cells discovered?** |
| **What defines cell shape and size?** |
| **What enables eukaryotes to perform more specialized functions than prokaryotes do?** |
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| **What does the cytoskeleton do?** |
| **How does DNA direct activity in the cytoplasm?** |
| **What organelles participate in protein production?** |
| **What is the role of vesicles in cells?** |
| **How do cells get energy?** |
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| **What makes cells and organisms different?** |
| **How are cells organized in a complex multicellular organism?** |
| **What makes an organism truly multicellular?** |
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| **How does the cell membrane help a cell maintain homeostasis?** |
| **How does the cell membrane restrict the exchange of substances?** |
| **What are some functions of membrane proteins?** |
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| **What determines the direction in which passive transport occurs?** |
| **Why is osmosis important?** |
| **How do substances move against their concentration gradients?** |
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| **How do cells use signal molecules?** |
| **How do cells receive signals?** |
| **How do cells respond to signaling?** |
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| **What type of energy is used in cells, and what is the ultimate source of this energy?** |
| **How is an organism’s metabolism related to the carbon cycle?** |
| **How is energy released in a cell?** |
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| **What is the role of pigments in photosynthesis?** |
| **What are the roles of the electron transport chains?** |
| **How do plants make sugars and store extra unused energy?** |
| **What are three environmental factors that affect photosynthesis?** |
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| **How does glycolysis produce ATP?** |
| **How is ATP produced in aerobic respiration?** |
| **Why is fermentation important?** |
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| **Why do cells divide?** |
| **How is DNA packaged into the nucleus?** |
| **How do cells prepare for division?** |
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| **What are the phases of the eukaryotic cell cycle?** |
| **What are the four stages of mitosis?** |
| **How does cytokinesis occur?** |
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| **What are some factors that control cell growth and division?** |
| **How do feedback signals affect the cell cycle?** |
| **How does cancer relate to the cell cycle?** |
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| **In asexual reproduction, how does the offspring compare to the parent?** |
| **In sexual reproduction, how does the offspring compare to the parent?** |
| **Why are chromosomes important to an organism?** |
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| **What occurs during the stages of meiosis?** |
| **How does the function of mitosis differ from the function of meiosis?** |
| **What are three mechanisms of genetic variation?** |
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| **What is a diploid life cycle?** |
| **What is a haploid life cycle?** |
| **What is alternation of generations?** |
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| **Why was Gregor Mendel important for modern genetics?** |
| **Why did Mendel conduct experiments with garden peas?** |
| **What were the important steps in Mendel’s first experiments?** |
| **What were the important results of Mendel’s first experiments?** |
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| **What patterns of heredity were explained by Mendel’s hypotheses?** |
| **What is the law of segregation?** |
| **How does genotype relate to phenotype?** |
| **What is the law of independent assortment?** |
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| **How can a Punnett square be used in genetics?** |
| **How can mathematical probability be used in genetics?** |
| **What information does a pedigree show?** |
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| **Are there exceptions to the simple Mendelian pattern of inheritance?** |
| **How do heredity and the environment interact to influence phenotype?** |
| **How do linked genes affect chromosome assortment and crossover during meiosis?** |
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| **What is genetic material composed of?** |
| **What experiments helped identify the role of DNA?** |
| **What is the shape of a DNA molecule?** |
| **How is information organized in a DNA molecule?** |
| **What scientific investigations led to the discovery of DNA’s structure?** |
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| **How does DNA replicate, or make a copy of itself?** |
| **What are the roles of proteins in DNA replication?** |
| **How is DNA replication different in prokaryotes and eukaryotes?** |
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| **What is the process of gene expression?** |
| **What role does RNA play in gene expression?** |
| **What happens during transcription?** |
| **How do codons determine the sequence of amino acids that results after translation?** |
| **What are the major steps of translation?** |
| **Do traits result from the expression of a single gene?** |
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| **What is the origin of genetic differences among organisms?** |
| **What kinds of mutations are possible?** |
| **What are the possible effects of mutations?** |
| **How can genetic change occur on a larger scale?** |
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| **Can the process of gene expression be controlled?** |
| **What is a common form of gene regulation in prokaryotes?** |
| **How does gene regulation in eukaryotes differ from gene regulation in prokaryotes?** |
| **Why are proteins so important and versatile?** |
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| **What can we learn by comparing genomes?** |
| **Can genetic material be stored and transferred by mechanisms other than chromosomes?** |
| **What are the roles of genes in multicellular development?** |
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| **Why is the Human Genome Project so important?** |
| **How do genomics and gene technologies affect our lives?** |
| **What questions about the human genome remain to be studied?** |
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| **For what purposes are genes and proteins manipulated?** |
| **How are cloning and stem cell research related?** |
| **What ethical issues arise with the uses of gene technologies?** |
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| **What are the basic tools of genetic manipulation?** |
| **How are these tools used in the major processes of modern gene technologies?** |
| **How do scientists study entire genomes?** |
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| **Why is evolutionary theory associated with Charles Darwin?** |
| **How was Darwin influenced by his personal experiences?** |
| **How was Darwin influenced by the ideas of others?** |
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| **What does Darwin’s theory predict?** |
| **Why are Darwin’s ideas now widely accepted?** |
| **What were the strengths and weaknesses of Darwin’s ideas** |
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| **How has Darwin’s theory been updated?** |
| **At what scales can evolution be studied?** |
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| **How is microevolution studied?** |
| **How is phenotypic variation measured?** |
| **How are genetic variation and change measured?** |
| **How does genetic variation originate** |
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| **What does the Hardy-Weinberg principle predict?** |
| **How does sexual reproduction influence evolution?** |
| **Why does population size matter?** |
| **What are the limits of the force of natural selection?** |
| **What patterns can result from natural selection?** |
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| **How can species be defined?** |
| **How do we know when new species have been formed?** |
| **Why is studying extinction important to understanding evolution?** |
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| **Why do biologists have taxonomic systems?** |
| **What makes up the scientific name of a species?** |
| **What is the structure of the modern Linnaean system of classification?** |
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| **What problems arise when scientists try to group organisms by apparent similarities?** |
| **Is the evolutionary past reflected in modern systematics?** |
| **How is cladistics used to construct evolutionary relationships?** |
| **What evidence do scientists use to analyze these relationships?**  **What are the kingdoms in Eukarya? Prokarya?**  **How does the population of one species affect another?**  **What is a pandemic? What are density dependent factors?** |