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| **Following the Big Ideas** | |
| **Big Idea 1** | Darwin’s theory of natural selection states that organisms survive because they possess more favorable adaptations to their environment; and these heritable traits are passed on to offspring |
| **Big Idea 4** | Evolution by natural selection comes about from interactions between an organism and its environment |

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| **Essential Questions** |
| * How can DNA analysis and genome comparisons allow us to better understand the evolution of species? |

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| **Vocabulary** | | |
| 1. Systematics 2. Phylogenic Tree 3. Taxonomy 4. Kingdom 5. Phylum 6. Class | 1. Order 2. Family 3. Genus 4. Species 5. Homology 6. Analogy | 1. Cladogram 2. Monophyletic 3. Paraphyletic 4. Polyphyletic 5. Molecular Clock 6. parsimony |

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| **Chapter Outline and Reading Guide** | |
| **Section 1**   1. Summarize in your own words   **Section 2**   1. Molecular systematics is a valuable tool used today to sort homology from analogy. What is molecular systematics?   **Section 3**   1. Clades are derived by using shared derived characters. What are these? 2. Explain why for mammals, hair is a shared derived character, but a backbone is a shared ancestral character.   **Section 4**   1. If we use a molecular clock, approximately when did HIV emerge? | **Section 5**  Taxonomy is in flux! When your authors were in high school, we were taught there were two kingdoms: plants and animals. Then in our college courses, we were introduced to five kingdoms: Monera, Protista, Plantae, Fungi, and Animalia. Now biologists have adopted a three-domain system, which consists of the domains Bacteria, Archaea, and Eukarya. This system arose from the finding that there are two distinct lineages of prokaryotes.   1. What two domains include all prokaryotes? 2. Which two domains are most closely related? Explain your reasoning. 3. Which kingdom is made obsolete by the three-domain system? Why? 4. Which kingdom crumbled because it is polyphyletic? 5. Explain the role of horizontal gene transfer in the ring of life hypothesis. |

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| **After You Have Read…** |

1. Complete the Science Inquiry question 9 on page 398.
2. Explain in a short essay how genetic information, along with the process of decent with modification, allows for scientists to construct phylogenetic trees that extend hundreds of millions of years.