

## EVOLUTION

**VOCABULARY** – Use the resources on Mr. Hanna’s website to define the following key terms related to heredity.

- 1) EVOLUTION – *change over time*
- 2) LAW OF SUPERPOSITION – *lower rock layers are older*
- 3) EMBRYO – *earliest growth stage of an organism*
- 4) HOMOLOGOUS STRUCTURES – *body parts in different species that are similar in structure and suggest a common origin*
- 5) VESTIGIAL STRUCTURES – *body parts in modern organisms that appear to NOT have a function*

**SHORT RESPONSE** – Provide a short answer (a few sentences or less) in response to each prompt.

- 6) What does it mean to say that species have “evolved”?  
*Life forms we observe today are different from the life forms of the past; they have changed*
- 7) How does the law of superposition help us interpret the fossil record to provide evidence supporting the theory of evolution?  
*If we find fossils in deeper rock layers, we can infer that they are older than fossils found in layers closer to the surface. In this way, we can compare what species looked over time.*
- 8) When scientists compare the early-stage embryos of very different species such as fish, chickens, and humans, what do they notice?  
*Comparing embryos of some species shows us that at these very early stages of life, the species look and develop VERY similarly to each other. This suggests that they may have shared a common ancestor in the distant past.*
- 9) When we compare the bone structure of a human arm with a cat leg, a whale fin, or even a bat wing, we notice similar bones with a similar layout. What does this suggest about these organisms?  
*Homologous structures suggest that the species who share them may have evolved from a common ancestor with a similar structure.*
- 10) Scientists have found pelvic bones in species such as whales and snakes that don’t have legs. Why might these animals have pelvic bones?  
*Scientists suggest that vestigial structures are left over from ancestors who once needed them, but since then the species has evolved so that those structures are no longer necessary. Since the structures did no harm to the individuals, there was no reason for them to be selected out of the population, so these structures remain even though they are useless. Pelvic bones in whales and snakes suggest that the ancestors of these species may once have had legs, but have since evolved to what we recognize today without legs.*
- 11) Why do scientists say that humans are more closely related to chimpanzees than orangutans (we share a more-recent common ancestor with chimps)? What evidence do we have to support this statement?  
*When scientists compare the DNA of animals, samples that are more similar suggest a common ancestor in the more recent past. Samples that are less similar suggest a common ancestor in the more distant past. Human DNA is more similar to chimpanzee DNA than any other primate, suggesting that we shared a common ancestor with chimps more recently than any*

*other primate. Because our DNA is more different than orangutan DNA, it suggests our ancestors branched off from their line longer ago.*

- 12) Slide 14 discusses the misconception that individual organisms evolve over their life span and pass these genetic changes on to their offspring, resulting in changes to the species. How does the picture of the Padaung woman with the neck coils “disprove” this misconception?

*If physical changes to an individual were passed on to the next generation, then the woman’s baby would have a long neck. Similarly, if someone has an arm or leg amputated, that doesn’t mean their baby will be born without an arm or leg...*

- 13) Slide 15 addresses the misconception that evolution arises from a species’ NEED to adapt. How do the examples of the Tasmanian Wolf or the Dodo Bird illustrate why this is an incorrect understanding of evolution?

*If species could adapt because they needed to, nothing would ever go extinct.*

- 14) If someone says in a conversation with you that they don’t believe in evolution because “Man didn’t come from no monkey!”, how can you respond to them so you might correct their misconception?

*The theory of evolution does not say that man comes from monkeys, it says that we shared a common ancestor in the far-distant past. Based on the phylogenetic tree on slide 12, hominids (the human line) broke off from the ape line (chimpanzees and bonobos) about 7 million years ago. This means that 7 million years ago, there was some kind of primate that would one day evolve into both apes and hominids.*

- 15) Look at the highlighted green box in the phylogenetic tree of life on slide 11. What do you think this illustration is trying to communicate?

*This illustrates how all life forms share a common ancestor at some point in the past. Since animals, plants, and fungi are so close on the “tree”, it says that those organisms are more closely related (their common ancestor was more recent) than the other organisms listed. Think about this for a moment...it’s saying that at some point in the past, Mr. Hanna shared a common ancestor with a potato...*

- 16) If you could “zoom in” on the phylogenetic tree from slide 11 where it branches off to say, “animals,” you might see something similar to the phylogenetic tree on slide 12. Zooming in on the bottom of that tree, we see a primate phylogenetic tree. Based on this illustration, do humans share a more-recent common ancestor with homo-erectus, chimpanzees, gorillas, or monkeys? How can you tell?

*Humans share a more recent common ancestor with chimpanzees. Humans and chimps share a more recent common ancestor with gorillas than with monkeys.*