Primate Branch Points

Read a branching history to compare common ancestors.

BIO.4.3 "Analyze cladograms/phylogenetic trees to illustrate relatedness between species."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the five sentences that describe a split in the primate family tree. Number them from the oldest split to the most recent so you can trace when lineages separated.

Who Shares a Recent Ancestor?

1. At a zoo, a visitor watches a lar gibbon swing past a Bornean orangutan enclosure. Nearby, a sign groups both species with western gorillas, common chimpanzees, humans, and rhesus macaques. How can a branching family tree show which of these primates share a more recent ancestor? Imagine tracing each species backward through a series of branch points. The oldest split in this six-species tree separates the rhesus macaque lineage from the lineage leading to all five apes. The next split separates the lar gibbon lineage from the lineage leading to the remaining four apes. Every species named here is alive today.

2. Follow the branch that remains after the lar gibbon split. Its next branch point separates the Bornean orangutan lineage from the lineages leading to western gorillas, common chimpanzees, and humans. Farther along, another branch point separates the western gorilla lineage from the lineages leading to common chimpanzees and humans. The most recent split in this tree separates the common chimpanzee lineage from the human lineage. Each split marks a common ancestral population whose descendants followed different evolutionary paths. The order of splits, not the order in which animal names appear on a page, tells you how recently two species shared an ancestor.

3. A branch point is not a living animal that turned into another living animal. Instead, both branches extend from ancestors that lived in the past. To compare any two species, trace their lineages backward until they meet. Then compare that meeting point with the meeting point for a different pair. A later meeting means a more recent common ancestor, even if one species looks less like the other to a casual observer. This tree does not measure how smart an animal is or how much it has advanced. All six species have continued to evolve since their lineages separated.

2 ANSWER WITH EVIDENCE

Use the passage

1. Is a human more closely related to a western gorilla or a Bornean orangutan in this tree? Use the order of splits to explain.

2. Is a common chimpanzee more closely related to a lar gibbon or a rhesus macaque in this tree? Explain using their common ancestors.

3. Which pair shares a more recent common ancestor: humans and common chimpanzees, or humans and western gorillas? Identify the split that shows this.

4. In this tree, is a western gorilla more closely related to a human or to a common chimpanzee? Explain your answer using one branch point.

3 YOUR TURN

Your own words

Invent a four-species evolutionary tree using the names Luma, Neri, Odo, and Pavi. In 3 to 4 sentences, state which lineage splits first and which two species split last, then make two different comparisons of relatedness and support each using common ancestors.

ANSWER KEY

Primate Branch Points

HIGH SCHOOL · BIO.4.3

PART 1 · READ AND MARK

Underline the five sentences that describe a split in the primate family tree. Number them from the oldest split to the most recent so you can trace when lineages separated. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	Is a human more closely related to a western gorilla or a Bornean orangutan in this tree? Use the order of splits to explain.	**A human is more closely related to a western gorilla. The orangutan lineage split off before the gorilla lineage did.**
2	Is a common chimpanzee more closely related to a lar gibbon or a rhesus macaque in this tree? Explain using their common ancestors.	**A common chimpanzee is more closely related to a lar gibbon. Their common ancestor lived after the macaque lineage split away.**
3	Which pair shares a more recent common ancestor: humans and common chimpanzees, or humans and western gorillas? Identify the split that shows this.	**Humans and common chimpanzees share the more recent common ancestor. Their lineages separate at the most recent split described.**
4	In this tree, is a western gorilla more closely related to a human or to a common chimpanzee? Explain your answer using one branch point.	**A western gorilla is equally related to both. Its lineage split before the human and chimpanzee lineages separated, so it shares the same branch point with each.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Pavi's lineage splits first, followed by Odo's lineage, and Luma and Neri split last. Luma is more closely related to Neri than to Odo because Luma and Neri share a more recent common ancestor. Neri is more closely related to Odo than to Pavi because the Neri and Odo lineages meet after Pavi's lineage split away.

For Part 1, accept the five split sentences across the first two paragraphs, numbered macaque, gibbon, orangutan, gorilla, then chimpanzee and human. For Part 3, accept any consistent branching order with two comparisons correctly justified by common ancestors.