

CHAPTERS 15–16 *Approximately 75% of this assignment is due in class on Wednesday, January 30, 2019
The completed assignment, in its entirety, is due Thursday, January 31, 2019*

Read Hillis Chapters 15 and 16. Answer the following concept questions in complete sentences:
Concept 15.2 (questions 1, 2, & 3); Concept 15.3 (questions 1 & 3); Concept 15.4 (ALL questions);
Concept 15.5 (question 3); Concept 15.6 (question 3); Concept 16.1 (questions 1 & 3);
Concept 16.2 (questions 1 & 2); Concept 16.3 (questions 1 & 3); Concept 16.4 (question 1)

Note:

- Chapter 15 is one of the most important chapters in the textbook. It is extremely important that you thoroughly read ALL sections of Chapter 15, including those that do not have assigned questions.
- When population frequencies differ from those predicted by Hardy-Weinberg, it is because the assumptions of Hardy-Weinberg have been violated. You should address the assumptions of the equation (pp. 298–299) in your response to question 3 in Concept 15.3.

CONFERENCE *By appointment; must be scheduled before Friday, March 22, 2019*

Answer the following questions in complete sentences:

1. Discuss your progress in AP Biology so far. What are you most proud of? Where do you need to improve?
2. Describe your goals for the remainder of the course and the AP exam. What score do you think is realistic for you to obtain on the exam? What specific steps will you take to accomplish this goal?
3. Describe how this course has changed your perspective on biology. How do you view biology—or science in general—differently than you did before starting AP Biology?
4. Describe how AP Biology has informed your understanding of how college courses are different from high school courses.

Schedule an appointment for a 5-minute midterm conference with me, at which time you will submit your written reflection. You are strongly encouraged to schedule your meeting as early in the semester as possible.

CHAPTERS 17–19 *Approximately 75% of this assignment is due in class on Monday, February 4, 2019
The completed assignment, in its entirety, is due Wednesday, February 6, 2019*

Read Hillis Chapter 17 and Section 19.1. Answer the following concept questions in complete sentences:
Concept 17.1 (questions 2 & 3); Concept 17.3 (questions 1 & 2); Concept 17.4 (question 2);
Concept 19.1 (questions 1, 3, & 4)

AP EXAM FEE *Due Friday, February 8, 2019*

Payment for all 2019 AP Exams must be submitted to Treasurer's Office, Room 150.

ESSAY 1 *Due Friday, February 8, 2019*

Answers must be written out in paragraph form. Outline form is not acceptable. Labeled diagrams may be used to supplement discussion, but a diagram without a written explanation will not receive credit. You must cite the source of all information you mention. Include the page number of information from the textbook or the web address of information found online.

Essay Question 1 is on the back of this sheet.

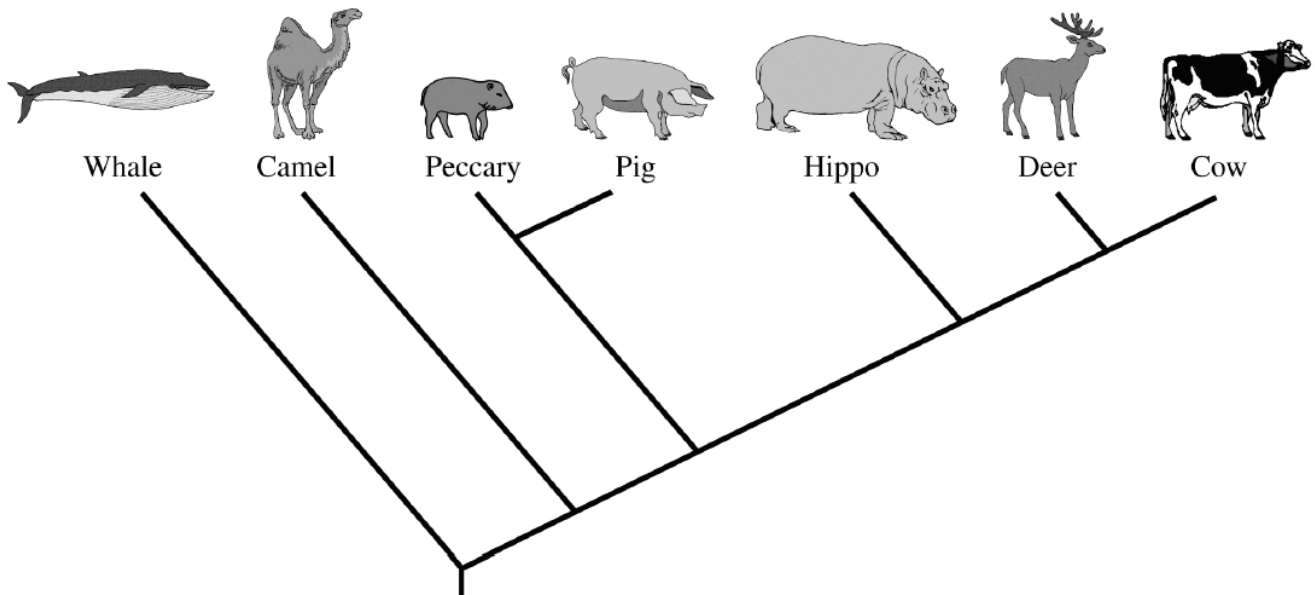


Figure 1. Phylogenetic tree representing the relationship of whales to six Artiodactyl species

| Bone | Cow | Deer | Whale | Hippo | Pig | Peccary | Camel |
|--------------------------|-----|------|-------|-------|-----|---------|-------|
| Distal tarsals | + | + | + | + | + | + | + |
| Calcaneum | + | + | + | + | + | + | + |
| Pulley-shaped astragalus | + | + | - | + | + | + | + |

Figure 2. Data on the presence of specific limb bones where + indicates the presence of the bone and - indicates the absence of the bone

| Locus | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---------|---|---|---|---|---|---|---|---|---|----|----|----|----|
| Cow | - | - | - | - | - | + | + | + | + | + | + | + | - |
| Deer | - | - | - | - | - | + | ? | + | + | + | + | + | - |
| Whale | + | + | + | + | + | - | ? | + | + | - | ? | + | - |
| Hippo | ? | - | + | + | + | - | + | + | + | - | ? | + | - |
| Pig | - | - | ? | - | - | - | ? | - | ? | - | - | + | + |
| Peccary | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | ? | + |
| Camel | - | - | - | - | - | - | - | - | - | - | - | - | - |

Figure 3. Data on the presence of specific DNA sequences where + indicates presence of the sequence, - indicates the absence of the sequence, and ? indicates that data is not available

The order Artiodactyla include hoofed animals whose weight is evenly distributed between the third and fourth toes. The figures above show one model for the relationship of whales of six Artiodactyl species along with morphological and genomic data comparing the species.

- Justify** the placement of the whale in the phylogenetic tree in Figure 1 using the morphological data from Figure 2.
- Refine** the model in Figure 1 by reconstructing the phylogenetic tree to better represent the genomic data in Figure 3. **Provide reasoning** to support your placement of the whale in your model.
- For BOTH the original model shown in Figure 1 and for your refined model, **identify** a monophyletic group, the closest relative to the whale, and the point at which the pulley-shaped astragalus bone was lost or gained.
- Determine** whether the morphological data in Figure 2 or the genomic data in Figure 3 are more likely to accurately represent the true evolutionary relationships between the species. **Provide reasoning** to support your answer.
- Describe** TWO features of a model to represent the speciation of separate Artiodactyl families from a common ancestor.