**Chapter 4**

**VISUAL SYSTEM: THE BRAIN**

1. Why do you think there is so much space in primary visual cortex dedicated to processing input from the fovea? Do you think this type of imbalance in favor of a specific segment of the input is also true for other senses? Which ones? Why do you think it may be true in some but not others?

*Hints and discussion: The fovea is responsible for providing information about color and fine detail, and has more receptors packed into it, so more cortex is required to process all of that information. Students may realize that a similar cortical organization is likely to be true for the sense of touch, with more cortex dedicated to the more sensitive parts of the body (i.e., fingertips, lips, tongue, and genitals).*

1. The chapter describes in detail how visual input is processed through visual cortex and beyond, but possibly something is missing from the neuroscience. How do you think visual experience arises from all this cortical activity? That is, how does the activation of neurons in visual cortex give rise to the perception of things? Where are images in the brain? Where are colors in the brain? How does the activity of populations of neurons give rise to the experience of ‘red’?

*Hints and discussion: This is an opportunity to introduce David Chalmer’s ideas of the “easy” and “hard” problems of consciousness. The “easy” problems are tackled in the chapter, showing how the brain organizes input. The “hard” problem is how this activity creates conscious experience, and further, how to define conscious experience. This is a good way to distinguish problems that can be tackled scientifically within psychology vs. those that cannot.*

1. Consider the phenomenon of blindsight, in which patients with damage to primary visual cortex still show some ability to respond to the visual world despite no conscious perception of it. What does this phenomenon say about the importance of consciousness in vision?

*Hints and discussion: This question can be used to help students think conceptually about the blindsight phenomenon, and also to show how perception is not always a form of conscious experience.*

1. What is the function of vision? How does the two-channel theory (i.e., the dorsal and ventral pathways) shed light on this question? In terms of this theory, do you think object recognition (e.g., recognizing a fork) is necessary for action (e.g., grasping and using the fork)? What does it mean that the “what” and “where” systems are functionally and anatomically separated?

*Hints and discussion: This question helps students think about the functions of the dorsal and ventral streams, and the section in the text regarding whether information from the two streams is ever integrated.*