Study Questions for Chapter 4

~ Define *synesthesia* and discuss how the phenomenon may reveal different, and otherwise normal, ways of brain organization.

~ Distinguish between *sensation* and *perception,* noting where in the body each process occurs, and explain why these processes are separable.

~ Discuss how *psychophysics* laid the foundation for the psychological study of *sensation* and *perception*.

~ Describe the relationships between the *absolute threshold, just noticeable difference,* and *Weber's law*.

~ Describe the principles of *signal detection theory,* discuss how it represents advancement over earlier research on thresholds, and relate to real-world decision making strategies.

~ Discuss why *sensory adaptation* is a useful process.

~ Compare the physical dimensions of wavelength, amplitude, and purity with their psychological counterparts, hue, brightness, and saturation.

~ Define the anatomical structures of the human eye and describe the path that light follows through it.

~ Distinguish between *rods* and *cones* and discuss how their relative concentrations around the *fovea* contribute to phototransduction in the retina.

~ Describe how *receptive fields* work in vision.

~ Distinguish between additive and subtractive color mixing, and then describe how we perceive color by *trichromatic color representation* and *color-opponent representation*.

~ Discuss visual processing in the brain, noting how *area V1* contributes.

~ Discuss neural systems for perceiving shape, and describe the dorsal and ventral streams of visual processing.

~ Illustrate the *binding problem* of perception by describing the *illusory conjunction;* describe how *feature integration theory* helps explain the binding problem, and discuss the role that attention and parietal processes play in feature binding.

~ Using perception of faces as an example, compare the *modular view* and the *distributed representation view* of object recognition, and describe the *perceptual constancy* that results from these processes.

~ Outline the basic principles of Gestalt perception, including simplicity, closure, continuity, similarity, proximity, common fate, and the figure/ground distinction.

~ Distinguish between *image-based* and *parts-based* object recognition theories.

~ Compare *monocular depth cues and binocular disparity* in vision and discuss how illusions of depth and size illustrate the otherwise typical process of perceiving depth or size.

~ Describe the processes involved in the perception of motion and change; briefly describe: *apparent motion, change blindness,* and *inattentional blindness.*

~ Compare the physical dimensions of sound wave frequency, amplitude, and complexity with their psychological counterparts, *pitch, loudness,* and *timbre.*

~ Define the anatomical structures of the ear and describe the path that sound follows from the pinna to the auditory nerve.

~ Discuss how auditory processing takes place in the brain, noting how *area A1, place codes,* and *temporal codes* all contribute.

~ Describe the basic operations of the body senses, discussing how touch, pain, and the senses of balance and movement occur.

~ Describe the components of the olfactory system and discuss how the *olfactory bulb, ORNs,* and the glomerulus work together in olfaction.

~ Describe the components of the taste system and discuss how *taste buds,* papillae, and microvilli work together in taste.